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NATIONAL DAM SAFETY PROGRAM. LITTLE CHOCONUT WATERSHED SITE 2A --ETC(U)
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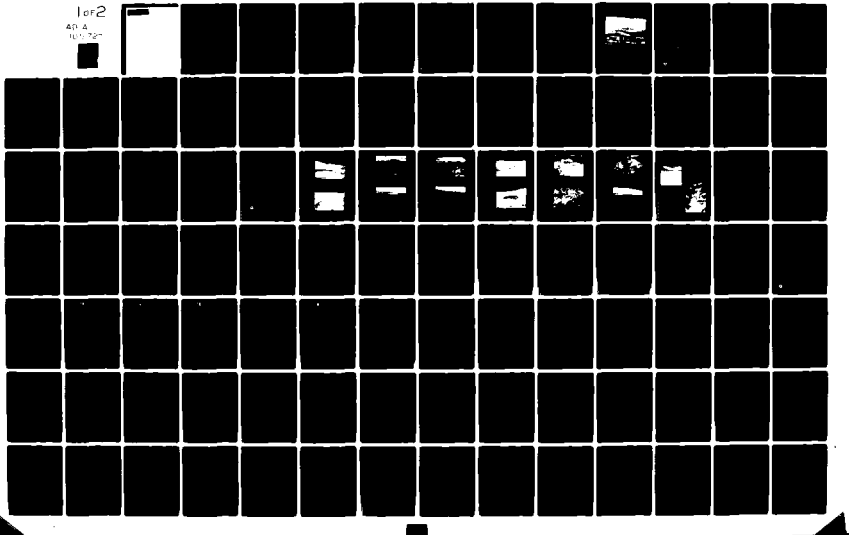

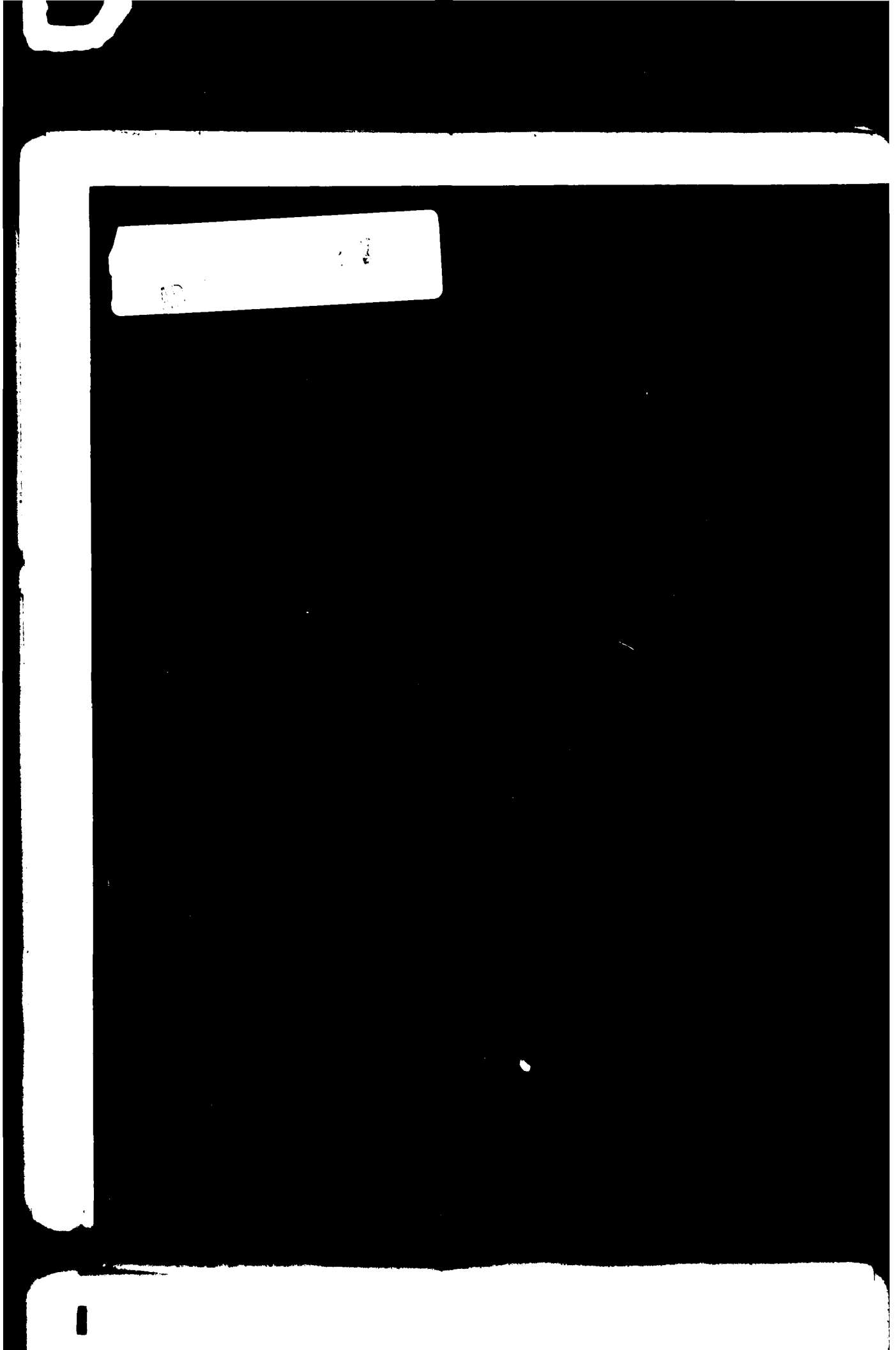

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National Dam Safety Program. Little Choconut Watershed Site 2A Dam (Inventory Number NY 720), Susquehanna River Basin, Broome County, New York. Phase I Inspection Report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety
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Visual Inspection
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Little Choconut Watershed
Site 2A Dam
Broome County
Susquehanna River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some minor deficiencies that need to be remedied.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Hydrologic/hydraulic analyses performed in accordance with the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams indicate that the principal spillway and the emergency spillway would pass 100 percent of the outflow from the Probable Maximum Flood (PMF) without overtopping the dam. Therefore, the combined spillway capacity is adjudged to be adequate.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LITTLE CHOCONUT WATERSHED SITE 2A DAM
INVENTORY NO. NY 720
SUSQUEHANNA RIVER BASIN
BROOME COUNTY, NEW YORK

TABLE OF CONTENTS

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Little Choconut Watershed Site 2A Dam

State Located: New York

County: Broome

Watershed: Susquehanna River Basin

Stream: Unnamed Tributary of Little Choconut Creek

Date of Inspection: December 15, 1980

ASSESSMENT

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some minor deficiencies that need to be remedied.

Hydrologic/hydraulic analyses performed in accordance with the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams indicate that the principal spillway and the emergency spillway would pass 100 percent of the outflow from the Probable Maximum Flood (PMF) without overtopping the dam. Therefore, the combined spillway capacity is adjudged to be adequate.

The dam has only minor deficiencies. The following corrective measures should be completed within 12 months from the final approval date of this report:

1. Repair local erosion gullies along the left side of the spillway outlet channel.

2. Mow the vegetation on the slopes of the embankment and emergency spillway channel annually.

3. Control access and foot traffic, taking necessary measures to prevent erosion.

4. Remove cattails in front of drop inlet structure and along the toe of the upstream slope.

5. Remove the barbed wire fence stretching across the entrance to the approach channel of the emergency spillway.

In the interim, develop a flood warning and emergency evacuation plan to alert the public in the event conditions occur which could result in failure of the dam.

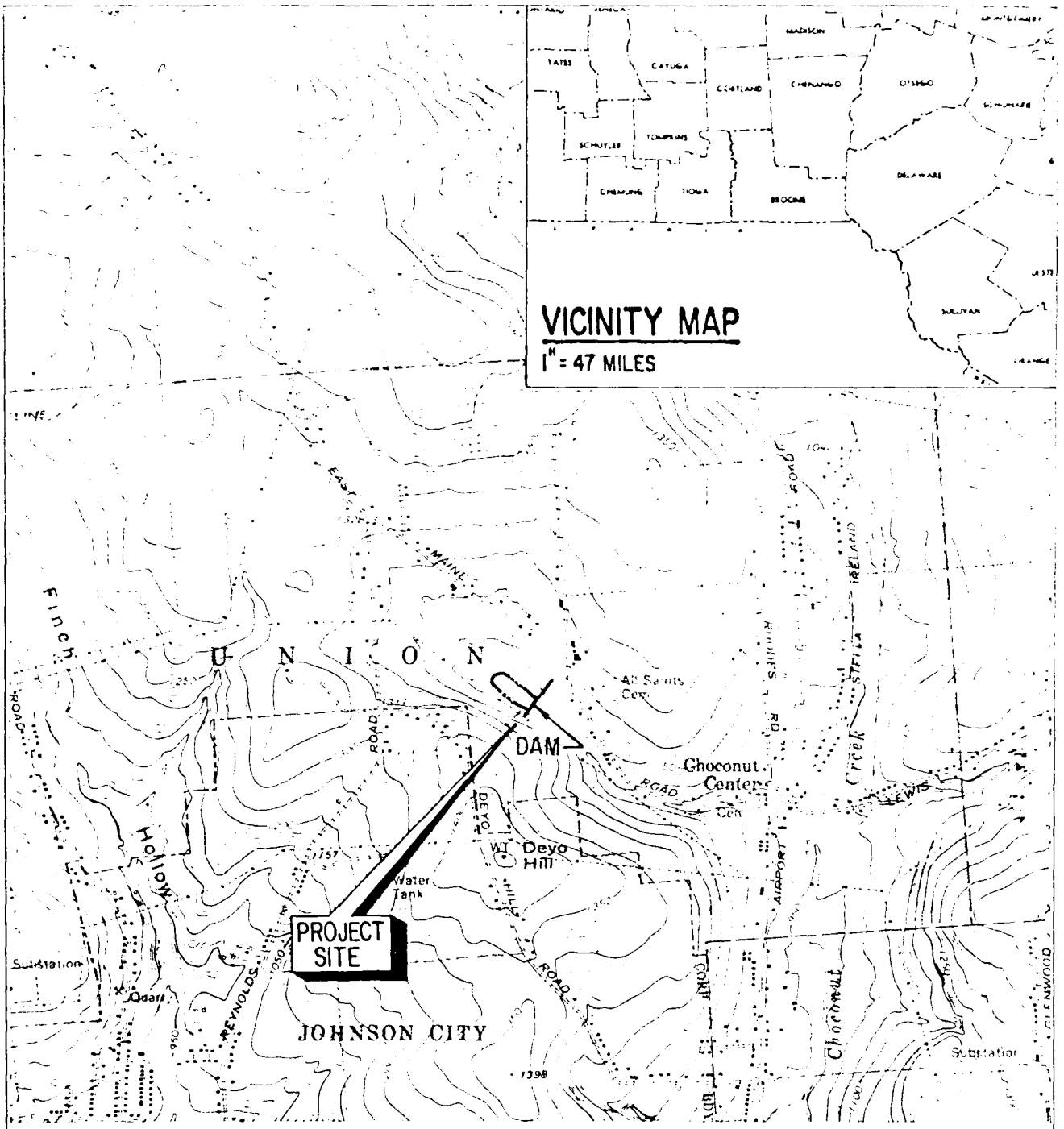
Submitted by: FLAHERTY GIAVARA ASSOCIATES, P.C.

Hugh C. Flaherty, P.E. & L.S.
Chairman of the Board
New York License No. 58508

Approved by: Col. W. M. Smith, Jr.
New York District Engineer

Date: 30 JUN 1981

PHOTO #1: Overview of
Little Choconut Watershed Site 2A Dam
Inventory No. NY 720



LOCATION MAP

LITTLE CHOCONUT WATERSHED SITE 2A DAM

INVENTORY No. NY 720

SUSQUEHANNA RIVER BASIN
BROOME COUNTY
UNION, NEW YORK

FLAHERTY · GIAVARA ASSOCIATES, P.C.

NATIONAL DAM SAFETY PROGRAM
PHASE I INSPECTION REPORT
LITTLE CHOCONUT WATERSHED SITE 2A DAM
INVENTORY NO. NY 720
D.E.C. NO. 96A-3628
SUSQUEHANNA RIVER BASIN
BROOME COUNTY, NEW YORK

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367. Flaherty Giavara Associates, P.C. has been retained by the New York District to inspect and report on selected dams in the State of New York. Authorization and notice to proceed was issued to Flaherty Giavara Associates, P.C. under a letter of December 24, 1980 from W. M. Smith, Jr. Colonel, Corps of Engineers. Contract No. DACW 51-81-C-0006 has been assigned by the Corps of Engineers for this work.

b. Purpose

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

Little Choconut Watershed Site 2A Dam consists of an earthen embankment with a concrete pipe principal spillway under the right side of the embankment and a vegetated emergency spillway channel cut into the left abutment. It is one of eight floodwater retarding dams in the Little Choconut, Finch Hollow, and Trout Brook watersheds designed to reduce floodwater damages. Plans, profiles and sections prepared for the project by the U.S. Department of Agriculture, Soil Conservation Service (SCS), are shown on drawings in Appendix F.

The dam embankment is approximately 530 feet long, 33 feet high and has an upstream slope of 3 horizontal to 1 vertical and a downstream slope of 2.5 to 1. The crest of

the dam is 14 feet in width and its elevation varies from 1156.6 to 1157.4 (NGVD). There is a 10 foot wide berm at the toe of the upstream slope just below normal pond level. The embankment has a homogeneous cross section of compacted glacial till and a 12 to 16 foot wide cutoff of the same material extending 5 to 10 feet below the original ground surface into a foundation primarily of glacial till and glacial lacustrine material over bedrock and extending to rock under the right abutment slope. The upstream and downstream slopes are provided with grass cover (crown vetch) for erosion protection. Riprap is in place around the principle spillway outlet. The embankment has an internal drain constructed in pervious fill located near the downstream toe of slope. Two 8 inch diameter perforated bituminous-coated corrugated metal pipes are embedded in the pervious fill to drain the embankment and they discharge at both sides of the principal spillway outlet.

The principal spillway is a drop inlet structure consisting of a single stage reinforced concrete riser, a 24 inch diameter prestressed concrete cylinder pipe (PCCP) and a channel excavated into bedrock at the outlet of the conduit.

The emergency spillway is a curved 80 foot wide channel with 3 to 1 side slopes cut into earth at the left abutment. It is about 650 feet long, extending below the dam in a fill section. The emergency spillway slopes gently downward both upstream and downstream from a 30 foot wide level section (the spillway crest) that is in the vicinity of the left side of the dam crest. Approximately 270 feet of the right channel slope is formed by a spur dike which has a 12 foot crest that varies in elevation from 1148.2 to 1156.6 (NGVD). The channel bottom and side slopes of the emergency spillway and the slopes and crest of the spur dike are vegetated.

b. Location

The Little Choconut Watershed Site 2A Dam is located off East Maine Road approximately 0.7 miles northwest of Choconut Center in the Town of Union, New York. The dam is located at latitude north 42°-08.8' and longitude west 75°-57.4' on the U.S. Geological Survey 7.5 minute series topographic map "Castle Creek, New York". The Location Map on page i indicates where the dam is situated.

c. Size Classification

The maximum height of the dam is 33 feet and the maximum storage capacity is 192 acre-feet at the design high water elevation. Therefore, the Little Choconut Water-

shed Site 2A Dam is classified as a "Small" dam as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

There are approximately 8 dwellings within the dam failure flood hazard area. East Maine Road, Airport Road and Stella Ireland Road are located downstream of the dam. Therefore, the dam is in the High Hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the County of Broome and maintained by the Broome County Soil & Water Conservation District. Their addresses and telephone numbers are as follows:

Owner

Contact: Carl S. Young, Broome County Executive
Broome County Building
Government Plaza
P.O. Box 1766
Binghamton, New York 13902

Telephone: (607) 772-2109

Maintenance

Contact: Mr. William Maxian, District Manager
Broome County Soil & Water Conservation District
Farm, Home & 4-H Center
840 Front Street
Binghamton, New York 13905

Telephone: (607) 773-2691

f. Purpose

The primary purpose of this dam is flood control in the Little Choconut Creek watershed to reduce floodwater damages.

g. Design and Construction History

The dam was designed by the Soil Conservation Service (SCS), of the U.S. Department of Agriculture (USDA) in 1965 and 1966. It was constructed by Les Strong Inc. of Whitney Point, New York in 1968. No major post construction modifications have been made to the dam.

h. Normal Operating Procedure

The intake riser is always open; therefore, the water level is maintained at the elevation of the crest of the intake orifice for normal flows. There are no regular operating procedures.

1.3 PERTINENT DATA

a. Drainage Area (Square Miles)	0.63
b. Discharge at Dam Site (CFS)	
- Top of Dam	3660
- Crest of Emergency Spillway	20
- Crest of Principal Spillway	2
- Reservoir Drain Inlet	-
c. Elevations (NGVD)	
- Top of Dam	1156.6
- Design High Water Level	1151.7
- Crest of Emergency Spillway	1149.9
- Crest of Principal Spillway	1136.8
- Reservoir Drain Inlet	1131.0
d. Reservoir Surface Area (Acres)	
- Top of Dam	24.3
- Design High Water Level	20.6
- Crest of Emergency Spillway	19.2
- Crest of Principal Spillway	4.0
e. Storage (Acre-Feet)	
- Top of Dam	302
- Design High Water Level	192
- Crest of Emergency Spillway	155
- Crest of Principal Spillway	8
f. Dam	
- Type: Homogeneous compacted glacial till with a glacial till cutoff	
- Crest Length (Feet)	530
- Upstream Slope (H:V)	3:1
- Downstream Slope (H:V)	2.5:1
- Crest Width (Feet)	14

g. Emergency Spillway

- Type: Excavated earthen channel; right bank is part of spur dike
- Length (Feet) 650
- Bottom Width (Feet) 80
- Side Slopes (H:V) 3:1
- Channel Bottom Slopes (Feet/Foot)
  upstream 0.010
  downstream 0.033

h. Principal Spillway

- Type: Drop inlet structure consisting of a single stage reinforced concrete riser, a 24 inch diameter prestressed concrete cylinder pipe (163 feet long) and a channel excavated into bedrock at the outlet end of the conduit

- Control: None

i. Reservoir Drain

- Type: 6 inch diameter cast iron mechanical joint pipe (25 feet long) having a trash rack and concrete pad and draining into the reinforced concrete riser

- Control: 6 inch flat frame slide gate located at the inlet to the reinforced concrete riser

j. Toe Drain

- Type: Two 8 inch diameter perforated bituminous-coated corrugated metal pipes in pervious fill

- Control: None

SECTION 2 - ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

The Little Choconut Watershed Site 2A Dam is located in the Appalachian Plateau physiographic province of New York State.

The topography in the area ranges from an elevation of 800 feet in the Susquehanna River to 1600 feet on some of the higher hills. Glacial action, while not having a greatly modifying effect on the topography, has had a smoothing tendency. Glacial lacustrine deposits in the valleys have decreased the pre-glacial relief. Scour and ablation of the ridge tops was slight, as the ice sheet was thin in this area. The outer limit of continental glaciation was only about 40 miles south of Binghamton.

The underlying bedrock is Upper Devonian in age and is almost exclusively shales and siltstones of the Catskill Delta. This site is situated on the southeast limb of the Horseheads Syncline. This syncline is one of a series of gently undulating folds that trend west and then southwest across the southern tier of counties in New York State. They are related to the intensely folded belt of the Appalachians and gradually disappear as a series of low, gentle swells to the north.

Historically, the site appears to have experienced some glacial scour of the valley bottom and southwest abutment. Subsequent melt waters deposited silts and clays in the valley bottom. These probably represent a northwesterly extension of a glacial lake formed in the Choconut and Susquehanna valleys. Till, associated with the glacial advance, mantles the rest of the site.

b. Subsurface Investigations

1. Centerline of Dam

The left abutment of this site is a fairly uniform, dense glacial till down to the vicinity of DH (drill hole) 51 (see Appendix F - Profiles). At this location, the till is underlain by silts and clays of relatively low density.

In the floodplain, the till is apparently absent in the upper section of the profile. (The presence of impounded water prevented any drilling in a section

approximately 160 feet in length along the centerline.

In the lower right abutment, the silts and clays are present in the entire profile down to a depth of 20 feet. Higher up the abutment, bedrock is within 6 or 7 feet of the surface and is overlain by till. At elevations above the top of the dam, the bedrock appears to be at or near the surface.

There were no materials encountered along the centerline that would be considered permeable.

The bedrock in the right abutment is an interbedded siltstone and shale. The upper two feet or so is weathered to a moderate degree. The column in general shows about 80% bedded 1 to 3 inches thick and fairly soft. The remaining 20% is an average 4 to 6 inches thick and considerably more competent. A set of joints oriented approximately north-south is well developed in this area. An east-west set is less well developed.

The bedrock surface drops off very steeply under the floodplain to an unknown depth.

2. Principal Spillway

Bedrock underlies the centerline of the principal spillway at varying depths ranging from 5.7 feet to 10.5 feet.

The material overlying the bedrock is approximately 4 feet of silt and 4 feet of clay at the location of TP (test pit) 301. Downstream toward the centerline of dam and the outlet structure, these materials grade into a mixture of alluvial and lacustrine deposits.

3. Emergency Spillway

The emergency spillway excavation is entirely in a fairly uniform glacial till. Bedrock was not encountered in any of the test pits, some of which were carried to 3 feet below design grade.

Several sandy streaks were noted in this till, and a minor amount of seepage was present in these sands.

2.2 DESIGN RECORDS

This dam was designed by the SCS in 1965 and 1966. As part of the design process, a design report, a geology report and soils testing were completed for the site. This data is in-

cluded in Appendix D.

2.3 CONSTRUCTION RECORDS

This dam was constructed in 1968 by Les Strong, Inc. of Whitney Point, New York. The contract drawings which were prepared by the SCS have been updated to reflect "As-Built" conditions and are included in Appendix F. In addition, detailed records kept by the SCS during construction are available at their office in Syracuse, New York.

2.4 OPERATION RECORDS

There were no operation records available for this dam.

2.5 EVALUATION OF DATA

The data presented herein was obtained primarily from the SCS office located in Syracuse, New York and also from the files of the New York State Department of Environmental Conservation (DEC). This information appears to be reliable and adequate for the purposes of a Phase I Inspection Report.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Little Choconut Watershed Site 2A Dam was conducted on December 15, 1980. The weather was overcast and the temperature was 15± °F. At the time of this inspection, there was approximately one inch of snow on the ground and water was flowing in the principal spillway outlet pipe (See Photo No. 11).

b. Dam

The earthfill embankment of the dam is generally in good condition. There was no visible evidence of settlement, lateral movement, seepage, major erosion, or other serious defects.

The following specific items were noted:

1. Foot traffic has worn paths along the upstream toe and at several locations on the embankment and channel slopes (See Photos No. 3 and 6). These have not yet significantly eroded.

2. The grass has been cut short on the relatively level surfaces, but is about 18 inches high on the embankment and cut slopes (See Photos No. 3, 4, 5, 6 and 7). However, the absence of brush is indicative of past periodic cutting.

3. There are local erosion gullies and/or small sinkholes along the upper portion of the left side of the spillway outlet channel (See Photo No. 12). These may reflect the composition and placement of waste material that extends along the emergency spillway channel slope to the outlet channel. They did not appear to be an indication of flow in the underlying old streambed. No active seepage was observed.

4. The toe drains were in good condition. The pipe draining the right side of the dam was flowing at a rate of approximately 1± gallons per minute (GPM) as depicted in Photo No. 15.

c. Principal Spillway

1. Drop Inlet Structure

The reinforced concrete drop inlet is in excellent condition. The inlet orifice was free of debris, and

had a trash rack in front of it. The heavy growth of cattails (See Photo No. 10) in front of the structure should be removed before they grow to obstruct the inlet. The gate stem for the low level drain was observed but not operated during the inspection.

2. Principal Spillway Conduit

The 24 inch diameter prestressed concrete cylinder pipe (PCCP) is in excellent condition where visible. The spillway conduit is vented on the upstream side of the dam (See Photo No. 14).

3. Principal Spillway Outlet

The 24 inch diameter conduit has a projecting end and discharges into a channel excavated into bedrock with a 0.5 foot drop. The riprap around the outlet appeared to be stable and in good condition (See Photo No. 11).

4. Principal Spillway Discharge Channel

The grass-lined channel has an initial width of 10 feet, and narrows slightly in the downstream direction. The side slopes are very steep, and typically 6 to 8 feet high. There are numerous sloughs and evidence of surface erosion on the sides. The banks have a heavy grass cover and a few isolated shrubs (See Photo No. 12). The bed of the channel is controlled by downstream bedrock exposures.

d. Emergency Spillway

The dam has an 80 foot wide earthen spillway excavated into the left abutment. The approach channel, spillway crest, and discharge channel all have a thick, heavy grass cover and are in good condition (See Photos No. 8 and 9).

The approach and discharge channels are separated from the dam embankment by an earthen spur dike, which is in good condition (See Photos No. 4 and 5).

There is a 4 foot high barbed wire fence across the entrance to the approach channel which could collect debris and inhibit flow through the spillway.

There was no evidence of cutoffs. The crest of the emergency spillway appears to slope towards the spur dike, and could concentrate flow on that side.

The discharge channel leads onto a broad spoil area below the dam. This open area slopes toward both the principal spillway discharge channel and the toe of the dam, and could allow water to flow along the toe.

e. Downstream Channel

The natural channel downstream of the dam site has a width of 10 to 20 feet. The streambed appears to have degraded about 2 feet in recent years, but currently appears stable. Bedrock is exposed along the right side of the channel. The bed consists of rock fragments (gravel to cobbles).

f. Reservoir - Storage Pool Area

The floodwater storage area is bordered by gently sloping fields with scattered trees on all except the right side. On the right side a heavily wooded slope steepens considerably at and above the design high water level (See Photos No. 2 and 13). There are no visible signs of instability or sedimentation problems in the reservoir area.

3.2 EVALUATION OF OBSERVATIONS

The visual inspection revealed some minor deficiencies. The following observations were made:

a. Local erosion gullies were noted in the emergency spillway outlet channel.

b. The grass was 18± inches high on the embankment and emergency spillway slopes.

c. Footpaths were observed along the upstream toe and on the slopes.

d. Cattails were growing around the drop inlet structure.

e. A barbed wire fence was observed across the emergency spillway entrance.

Based on the visual examination conducted on December 15, 1980, the Little Choconut Watershed Site 2A Dam is considered to be in good condition. The minor deficiencies which have been observed should not have a serious effect on the performance or safety of the structure.

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal water surface level is maintained by the orifice of the drop inlet structure at elevation 1136.8 (NGVD). No operational procedures are in effect at this time.

4.2 MAINTENANCE OF DAM

The dam is maintained by the Broome County Soil & Water Conservation District. Presently the following yearly maintenance items are performed:

a. Mowing the dam crest and the bottom of the emergency spillway channel; however, the mowing of the slopes of the embankment and emergency spillway is only done every three years.

b. Maintenance of riprap.

c. Maintenance of the trash rack on the drop inlet structure.

d. Inspection of concrete and pipes.

e. Inspection of the dam embankment for seepage.

f. Operation of the gate used to drain the impoundment.

g. Repairs to fences and roads are made as necessary.

4.3 WARNING SYSTEM

No warning system is now in effect; however, the Broome County Soil & Water Conservation District is in the process of preparing an emergency action plan and warning system for the dam to be implemented in the event of dam failure.

4.4 EVALUATION

The operation and maintenance procedures of the dam and appurtenances are satisfactory. However, increased maintenance efforts are required to correct the minor deficiencies which exist.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The dam is located on an unnamed tributary 4500± feet upstream of Little Choconut Creek. The unnamed tributary joins Little Choconut Creek near Choconut Center, approximately four miles upstream of the Susquehanna River at Johnson City, New York.

The watershed (shown on the Watershed Map on page C-5 in Appendix C) consists of 406 acres (0.63 square miles) of rolling to hilly uplands with typical slopes of 10 percent. Land use within the watershed is primarily agricultural, with extensive open fields and orchards. There are no significant waterbodies or wetlands upstream of the dam.

The watercourse upon which the dam is located is a small perennial stream with a typical flow width of 10 feet and a typical flow depth of 5 inches.

5.2 ANALYSIS CRITERIA

The purpose of the hydrologic/hydraulic analysis is to evaluate the spillway capacity and the potential for overtopping. The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers HEC-1 Computer Model - Dam Safety Version. The procedure included determining the Probable Maximum Flood (PMF) runoff from the watershed and routing the inflow hydrograph through the impoundment to determine the outflow hydrograph. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated.

The initial rainfall loss was assumed to be 1.0 inches, and the uniform rainfall loss was assumed to be 0.1 inches per hour. In accordance with recommended guidelines of the Corps of Engineers, the Probable Maximum Precipitation (PMP) was 23.5 inches (6 hour duration, 10 square mile area).

The analysis was conducted for both the full PMF and for several fractional PMF conditions. The PMF inflow of 2086 CFS was routed through the reservoir and the peak outflow was determined to be 1990 CFS.

5.3 SPILLWAY CAPACITY

The total outlet capacity is the sum of discharges from the principal spillway and the emergency spillway.

The principal spillway consists of a drop inlet and conduit. Its flow capacity was evaluated by assuming that its capacity

was controlled by the inlet, which acts as an orifice when submerged by water stages more than one foot above its invert. The area of the orifice is 1.2± square feet, the coefficient of discharge is 0.6, and the centerline elevation is 1137.3 (NGVD).

The emergency spillway is an 80 foot wide trapezoidal-shaped vegetated channel. The SCS design information indicates the emergency spillway was designed to be used only by a flood event with an average return frequency of more than 100 years.

The stage discharge curve for the combined principal and emergency spillways was obtained from the Soil Conservation Service design report for the stages above and including elevation 1149.9 (NGVD) and is tabulated below:

Stage (Feet)	Discharge Capacity (CFS)	Element of Structure
1136.8	0	Sediment Pool
1140.0	9.5	--
1149.9	19.9	Emergency Spillway Crest
1151.7	388	Design High Water
1156.6	3660	Top of Dam

The total spillway capacity at the top of dam is 3660 CFS.

The principal spillway can pass approximately 22 percent of the PMF before use of the vegetated emergency spillway would be required.

The energy grade line of the PMF discharge would be 4.2 feet above the crest of the emergency spillway. The average flow velocity in the emergency spillway discharge channel would be 10.5 feet per second (FPS).

5.4 RESERVOIR CAPACITY

The storage capacity of the reservoir was obtained from the Soil Conservation Service design report, as indicated below:

Stage (Feet)	Storage (Acre-Feet)	Storage (Inches of Runoff)
1136.8	8	0.24
1149.9	155	4.58
1151.7	192	5.67
1156.6	302	8.93

5.5 FLOODS OF RECORD

The maximum floods of record for this dam are summarized below:

Date	Event	Maximum Flood Stage Elevation (NGVD)	Feet Below Crest of Emergency Spillway (El. 1149.9)
9/26/75	Hurricane Eloise	1145.2	4.7
6/24/72	Hurricane Agnes	1142.5	7.4
2/24/75	--	1141.5	8.4

It should be noted that floodwaters have never reached the emergency spillway crest.

5.6 OVERTOPPING POTENTIAL

The results of the HEC-1 DB computer analysis indicate that the crest of the dam is not overtopped by the PMF event. The PMF discharge rate of 1990 CFS would occur at a peak flood stage of 1154.1 feet, which is 2.5 feet below the crest of the dam.

The results of the analysis are tabulated below:

Flood Condition	Peak Inflow (CFS)	Peak Outflow (CFS)	Maximum Stage Elevation (NGVD)
0.5 PMF	1043	910	1152.5
1.0 PMF	2086	1990	1154.1

5.7 EVALUATION

Using the Corps of Engineers' screening criteria for initial review of spillway adequacy, it has been determined that the dam would not be overtopped by either the full Probable Maximum Flood (PMF) or one half the PMF. Approximately 2.5 feet of freeboard would exist between the PMF maximum water level and the crest of the dam. Therefore, the spillway is adjudged to be adequate.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

There was no visible evidence of settlement, lateral movement or other signs of structural instability of the dam during the site examination. However, the pool level was approximately 20 feet below the top of the dam at the time, with the result that the forces tending to cause instability were much lower than design levels. Based on the conditions that were observed, there is no reason to question the static structural stability of the dam.

b. Design and Construction Data

Soil Conservation Service record drawings for the Little Choconut Watershed Site 2A Dam (See Appendix F) show a configuration and cross section for the embankment that corresponds to the information presented and analyzed in the SCS Geology Report, dated February 1966; in the Memorandum presenting test results, design parameters and stability analyses, dated April 20, 1966; and in the Design Report, dated November 1966.

While there is no construction data available to confirm the actual physical properties of the earthfill in the embankment, the design properties presented in the SCS reports are considered to be reasonable, and the dam would be expected to have adequate safety margins with respect to stability under static loading conditions. Additionally, toe drains control the phreatic surface and provide a safe outlet for foundation seepage.

A slope stability analysis was performed by the SCS on the embankment of the dam using the Swedish Circle method and adopted design data (See page D-6 of Appendix D). The results of the analysis are tabulated below:

Location	Slope (H:V)	Conditions	Factor of Safety
Upstream slope	3:1	Full drawdown; no berm	2.8
Downstream slope	2.5:1	No drain; no berm	2.5

The assumptions and method used are considered reasonable; therefore, the resulting factors of safety are adequate.

c. Seismic Stability

The Little Choconut Watershed Site 2A Dam is located in Seismic Zone 1, and in accordance with recommended Phase I guidelines does not require seismic analysis.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Condition

On the basis of the visual examination, the Little Choconut Watershed Site 2A Dam is considered to be in good condition. There were no signs of impending structural failure or other conditions which would warrant urgent remedial action, and only minor deficiencies were noted.

b. Adequacy of Information

The evaluation of this dam is based primarily on visual examination, reference to available SCS plans, approximate hydraulic and hydrologic computations, and application of engineering judgement. The visual examination was somewhat hampered by low pool level and light snow cover; however, the available information that was obtained is adequate for the purposes of a Phase I assessment.

c. Need for Additional Investigations

No additonal investigations are required for this dam.

d. Urgency

The recommended measures presented in Section 7.2 should be carried out by the owner within 12 months of the final approval date of this report. In the interim, a detailed flood warning and emergency evacuation plan should be developed and implemented.

7.2 RECOMMENDED MEASURES

Although the dam is generally in good condition, it is considered important that the following items be accomplished:

a. Repair local erosion gullies along the upper portion of the left side of the spillway outlet channel.

b. Mow the vegetation on the slopes of the dam embankment and emergency spillway annually.

c. Control access and foot traffic and take necessary measures to prevent erosion.

d. Remove cattails in front of the drop inlet structure, and along the toe of the upstream slope of the dam.

e. Remove the barbed wire fence across the entrance to the approach channel of the emergency spillway.

APPENDIX A

PHOTOGRAPHS

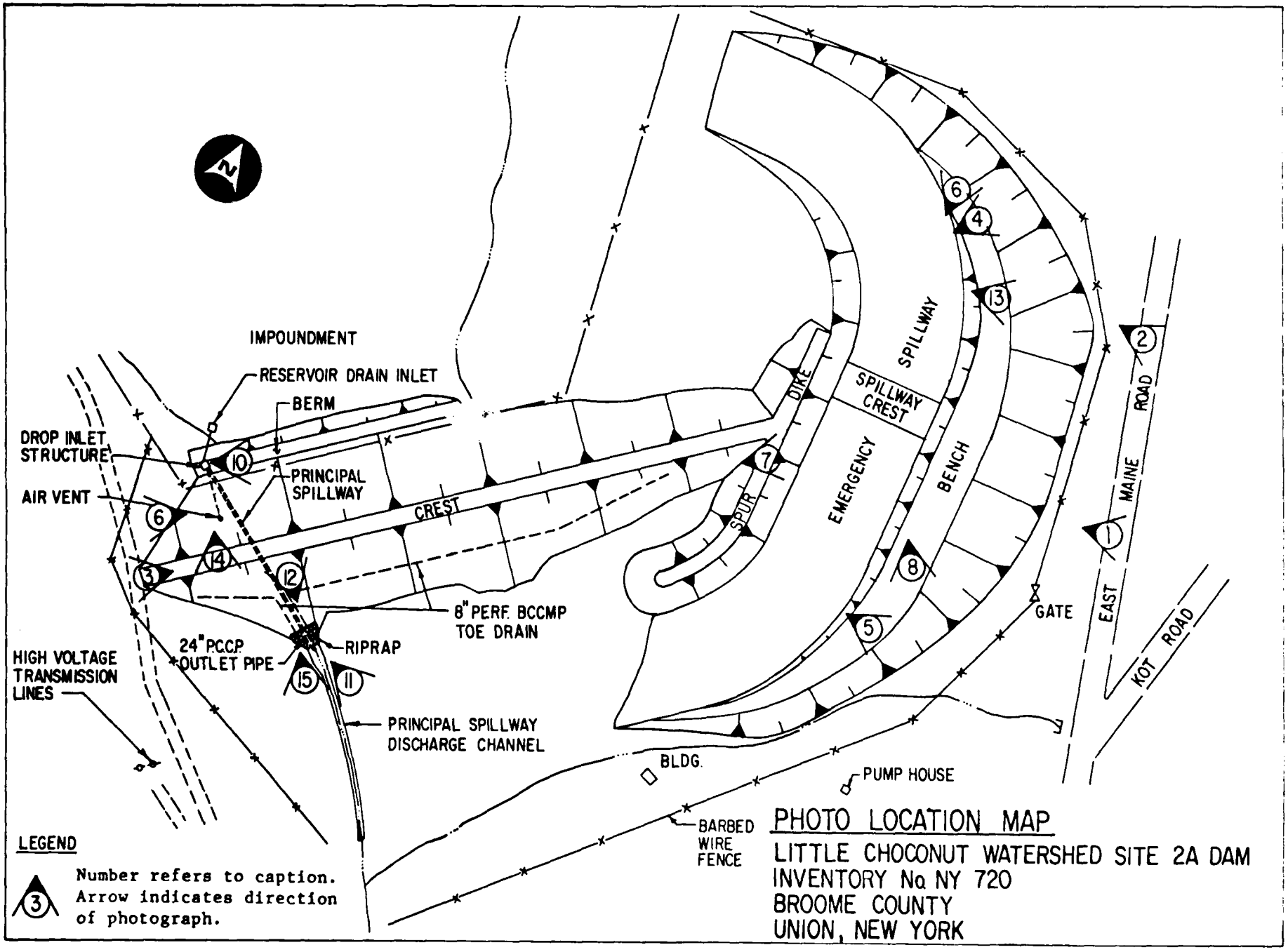


PHOTO LOCATION MAP

LITTLE CHOCONUT WATERSHED SITE 2A DAM
INVENTORY No NY 720
BROOME COUNTY
UNION, NEW YORK

PHOTO #2: Overview of watershed and impoundment

PHOTO # 3: Crest of dam looking toward left abutment

PHOTO #4: Overview of upstream face of dam

PHOTO #5: Overview of downstream face of dam

PHOTO #6: Upstream face of dam and air vent

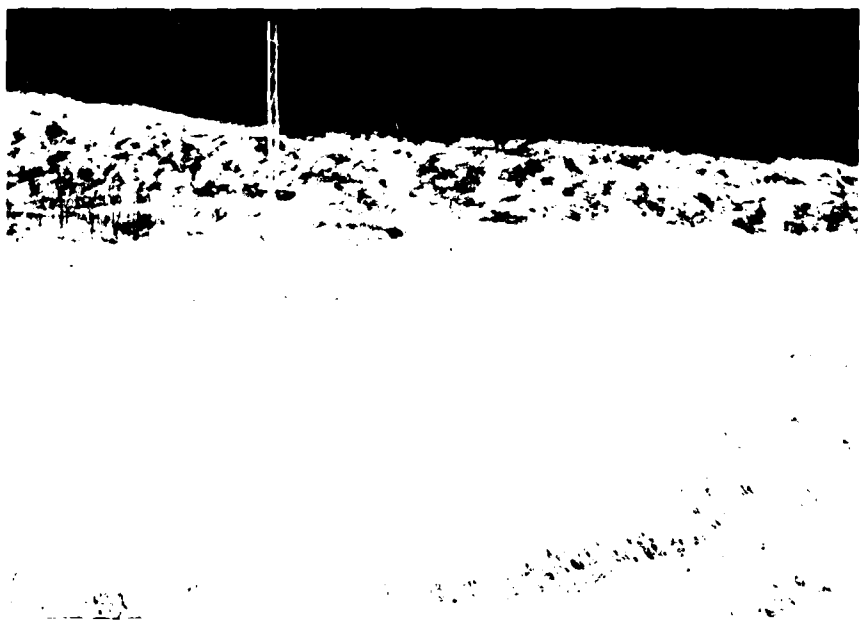


PHOTO #7: Downstream face of dam

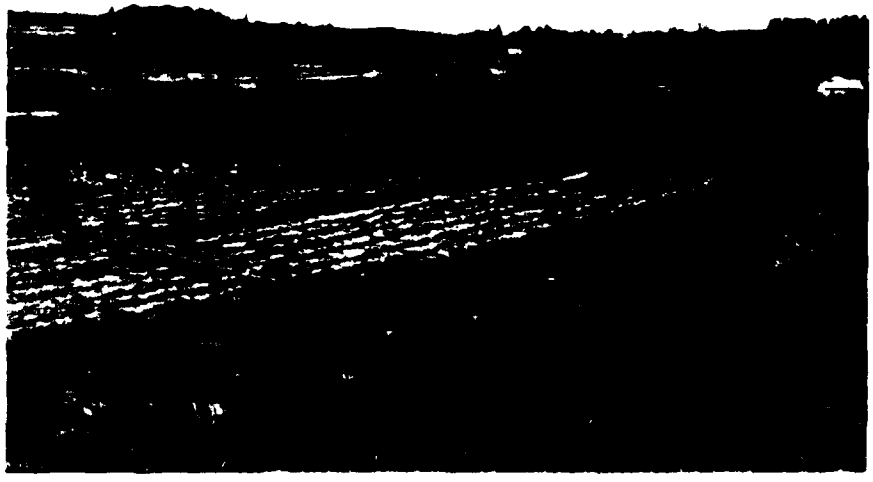


PHOTO #8: Emergency spillway looking upstream

PHOTO #9: Crest of emergency spillway looking downstream

PHOTO #10: Drop inlet structure

PHOTO #11: Outlet works: 24" prestressed concrete cylinder pipe (P.C.C.P.) and toe drains

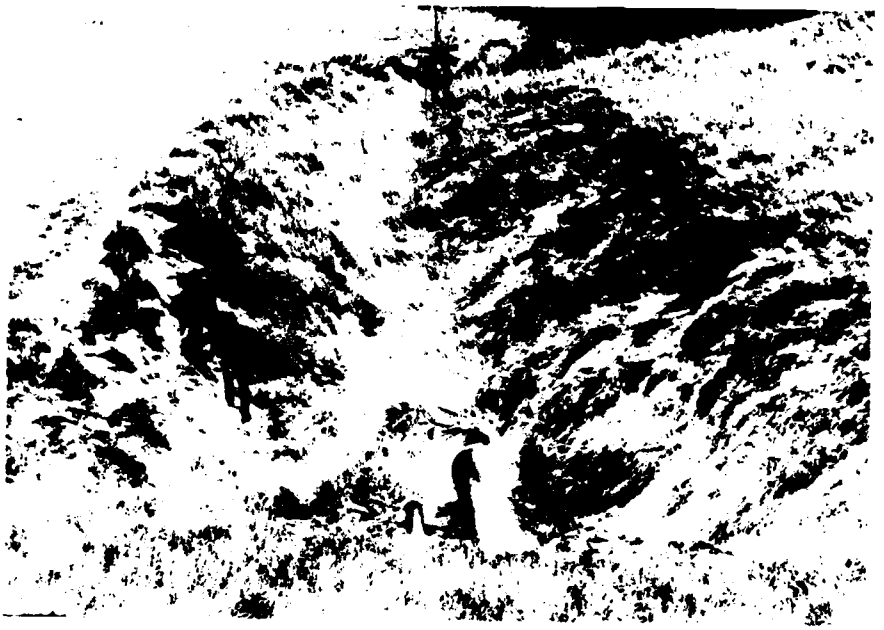


PHOTO #12: Downstream channel conditions

PHOTO #13: Impoundment

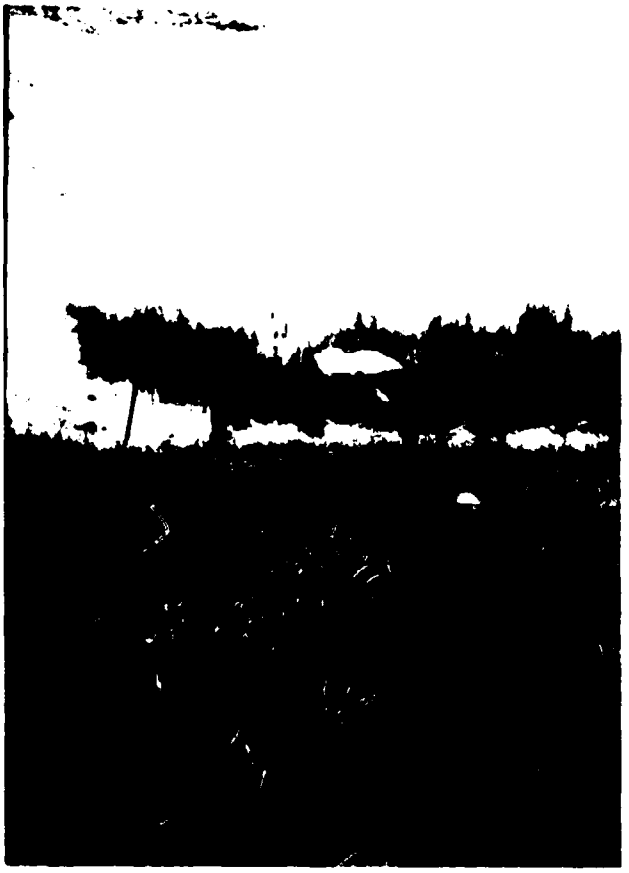


PHOTO #14: Air vent and drop inlet structure

PHOTO # 15: Toe drain (flowing)

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Little Choconut Watershed-Site 2A Dam

Fed. I.D. # NY 720 **DEC Dam No.** 96A-3628

River Basin Susquehanna

Location: Town Union **County** Broome

Stream Name Unnamed

Tributary of Little Choconut Creek

Latitude (N) 42°-08.8' **Longitude (W)** 75°-57.4'

Type of Dam Earthen embankment

Hazard Category High

Date(s) of Inspection December 15, 1980

Weather Conditions Overcast - 15± °F.

Reservoir Level at Time of Inspection Elevation 1136.8

b. Inspection Personnel

R.C. Smith, T.L. Ward and J.G. MacBroom of Flaherty Giavara Associates; P.L. LeCount and J.J. Rixner of Haley & Aldrich, Inc.; S. Dhawan and L. Comrie of Salmon Associates

c. Persons Contacted (Including Address & Phone No.)

Gary L. Page Binghamton Watershed Office Soil Conservation Service P.O. Box 1255 Broome County Airport Binghamton, NY 13902 (607) 773-2751	Donald W. Lake, Jr. Soil Conservation Service 771 Federal Building 100 South Clinton Street Syracuse, NY 13260 (315) 423-5505

d. History:

Date Constructed 1968 **Date(s) Reconstructed** Never

Designer Soil Conservation Service

Constructed By Les Strong, Inc.

Owner County of Broome

2) Embankment

a. Characteristics

(1) Embankment Material Silty and clayey gravel

(2) Cutoff Type Compacted glacial till

(3) Impervious Core None

(4) Internal Drainage System Two perforated 8" BCCMP toe drains on either side of principal spillway outlet; right pipe-dry, left pipe flowing (1± GPM)

(5) Miscellaneous No comments

b. Crest

(1) Vertical Alignment Excellent; slightly crowned at the center of the dam.

(2) Horizontal Alignment Excellent; substantially straight

(3) Surface Cracks None observed

(4) Miscellaneous Mowed grass

c. Upstream Slope

(1) Slope (Estimate - V:H) 1:3

(2) Undesirable Growth or Debris, Animal Burrows Cattails growing at the toe of slope and around the drop inlet structure

(3) Sloughing, Subsidence or Depressions None evident

(4) Slope Protection Grass, 18+" high

(5) Surface Cracks or Movement at Toe None evident; footpath along berm at toe of slope

d. Downstream Slope

(1) Slope (Estimate - V:H) 1:2.5

(2) Undesirable Growth or Debris, Animal Burrows None evident

(3) Sloughing, Subsidence or Depressions None evident

(4) Surface Cracks or Movement at Toe None evident

(5) Seepage None observed

(6) External Drainage System (Ditches, Trenches, Blanket) None observed

(7) Condition Around Outlet Structure Riprap surrounds the outlets of the principal spillway and toe drains

(8) Seepage Beyond Toe None observed

e. Abutments - Embankment Contact

Good condition

(1) Erosion at Contact None evident

(2) Seepage Along Contact None observed

3) Drainage System

a. Description of System Drop inlet structure consisting of a reinforced concrete riser, a 24 inch diameter conduit and a bedrock discharge channel

b. Condition of System Excellent

c. Discharge from Drainage System Channel excavated out of bedrock

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Peizometers, Etc.)

Monumentation of centerline of dam

5) **Reservoir**

a. **Slopes** Gentle slopes with scattered trees on all sides except the right side which has a heavily wooded steep slope

b. **Sedimentation** Design figures for storage allow for 19 acre-feet of sediment

c. **Unusual Conditions Which Affect Dam** Low sediment pool level

6) **Area Downstream of Dam**

a. **Downstream Hazard (No. of Homes, Highways, etc.)** Approximately 8 dwellings are within the flood hazard area as well as East Maine Road, Airport Road and Stella Ireland Road

b. **Seepage, Unusual Growth** None observed

c. **Evidence of Movement Beyond Toe of Dam** None observed

d. **Condition of Downstream Channel** Some degradation of streambed in recent years, but currently stable; exposed, weathered bedrock along right side

7) **Spillway(s) (Including Discharge Conveyance Channel)**

Principal spillway, emergency spillway and discharge conveyance channel

a. **General** Principal spillway and discharge conveyance channel handle normal flows, while the emergency spillway conveys flood events with average return frequencies greater than 100 years.

b. **Condition of Principal Spillway** Very good; however, cattails are growing around the orifice and would impede flood flows during submergence of the drop inlet structure.

c. **Condition of Emergency Spillway** Very good; however, a barbed wire fence across the entrance to the approach channel would collect debris causing a flow rate reduction. The discharge channel leads to a broad spoil area which appears to slope toward the toe of dam, thereby allowing water to flow along the toe.

d. **Condition of Discharge Conveyance Channel** Fair; there are numerous sloughs, evidence of surface erosion and the banks have a heavy grass cover and isolated shrubs.

8) **Reservoir Drain/Outlet**

Type: Pipe Two Conduit _____ Other _____

Material: Concrete X Metal X Other _____

Size: Concrete: 24 inch, Metal: 6 inch **Length** 163 feet and 22 feet

Invert Elevations: **Entrance** 1131.0 **Exit** 1127.5

Physical Condition (Describe): **Unobservable** X

Material: Prestressed concrete cylinder and cast iron

Joints: Rubber/steel and mechanical **Alignment** straight

Structural Integrity: Excellent

Hydraulic Capability: Good

Means of Control: Gate Flat frame slide gate Valve _____ Uncontrolled _____

Operation: Operable X Inoperable _____ Uncontrolled _____

Present Condition (Describe): Each pipe is in excellent condition

9) Structural

a. **Concrete Surfaces** Excellent condition

b. **Structural Cracking** None observed

c. **Movement - Horizontal & Vertical Alignment (Settlement)** None evident

d. **Junctions with Abutments or Embankments** Not applicable

e. **Drains - Foundation, Joint, Face** See Section 2) Embankment, a. Characteristics, (4) Internal Drainage System

f. **Water Passages, Conduits, Sluices** 6 inch flat frame slide gate on the reservoir drain at its inlet to the reinforced concrete riser

g. **Seepage or Leakage** None observed

h. **Joints - Construction, etc.** Rubber and steel joints on the 24" prestressed concrete cylinder pipe and mechanical joints on the 6" reservoir drain

i. **Foundation** Not applicable

j. **Abutments** Not applicable

k. **Control Gates** 6" flat frame gate on the reservoir drain at its inlet to the reinforced concrete riser

l. **Approach & Outlet Channels** Not applicable

m. **Energy Dissipators (Plunge Pool, etc.)** Bedrock channel downstream of principal spillway outlet

n. **Intake Structures** Reinforced concrete riser has a 14" X 12" orifice

o. **Stability** No evidence of structural instability

p. **Miscellaneous** No comments

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition None

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1156.6	24.3	302
2) Design High Water (Max. Design Pool)	1151.7	20.6	192
3) Emergency Spillway Crest	1149.9	19.2	155
4) Pool Level with Flashboards	--	--	--
5) Principal Spillway Crest	1136.8	4.0	8

DISCHARGES:

	Volume (cfs)
1) Average Daily	Unknown
2) Emergency Spillway @ Maximum High Water (Top of Dam)	3635
3) Emergency Spillway @ Design High Water	366
4) Principal Spillway @ Emergency Spillway Crest	20
5) Low Level Outlet @ Principal Spillway Crest	2
6) Total (of all facilities) @ Maximum High Water	3660
7) Maximum Known Flood	Unknown
8) At Time of Inspection	1±

CREST: ELEVATION: 1156.6

Type Earthen Embankment

Width 14± Ft Length 530 Ft

Spillover Vegetated emergency spillway

Location Left abutment

SPILLWAY:

PRINCIPAL		EMERGENCY
1136.8	Elevation	1149.9
Drop Inlet Structure	Type	Earth Excavated
14" x 12" orifice with vertical face	Width	80 feet
	Type of Control	
Orifice	Uncontrolled	Weir
-	Controlled	-
-	Type: (Flashboards; gate)	-
One	Number	One
24 in/163 ft	Size/Length	80 ft/650 ft
Concrete	Invert Material	Grass surface on earth
Continuously	Anticipated Length of Operating Service	9.34 hours
Not Applicable	Chute Length	310 feet
1 ft	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	Slope = 0.010

Type: _____

Location: _____

Records:

Date September 26, 1975

Max. Reading Elevation 1145.2 (NGVD)

FLOOD WATER CONTROL SYSTEM:

Warning System Under preparation by the Broome County Soil & Water Conservation District

Method of Controlled Releases (mechanisms) Manually controlled slide gate to drain the impoundment

DRAINAGE AREA: 406 Acres, 0.63 Square Miles

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type Rural Agriculture

Terrain - Relief Rolling

Surface - Soil Glacial Till

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

Dense glacial till soils with open fields some residential houses.

Average watershed slope is 10±%

Potential Sedimentation problem areas (natural or man-made; present or future)

Surface erosion form fields during fallow periods

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

None

Dikes - Floodwalls (overflow & non-overflow) - **Low reaches along the reservoir perimeter:**

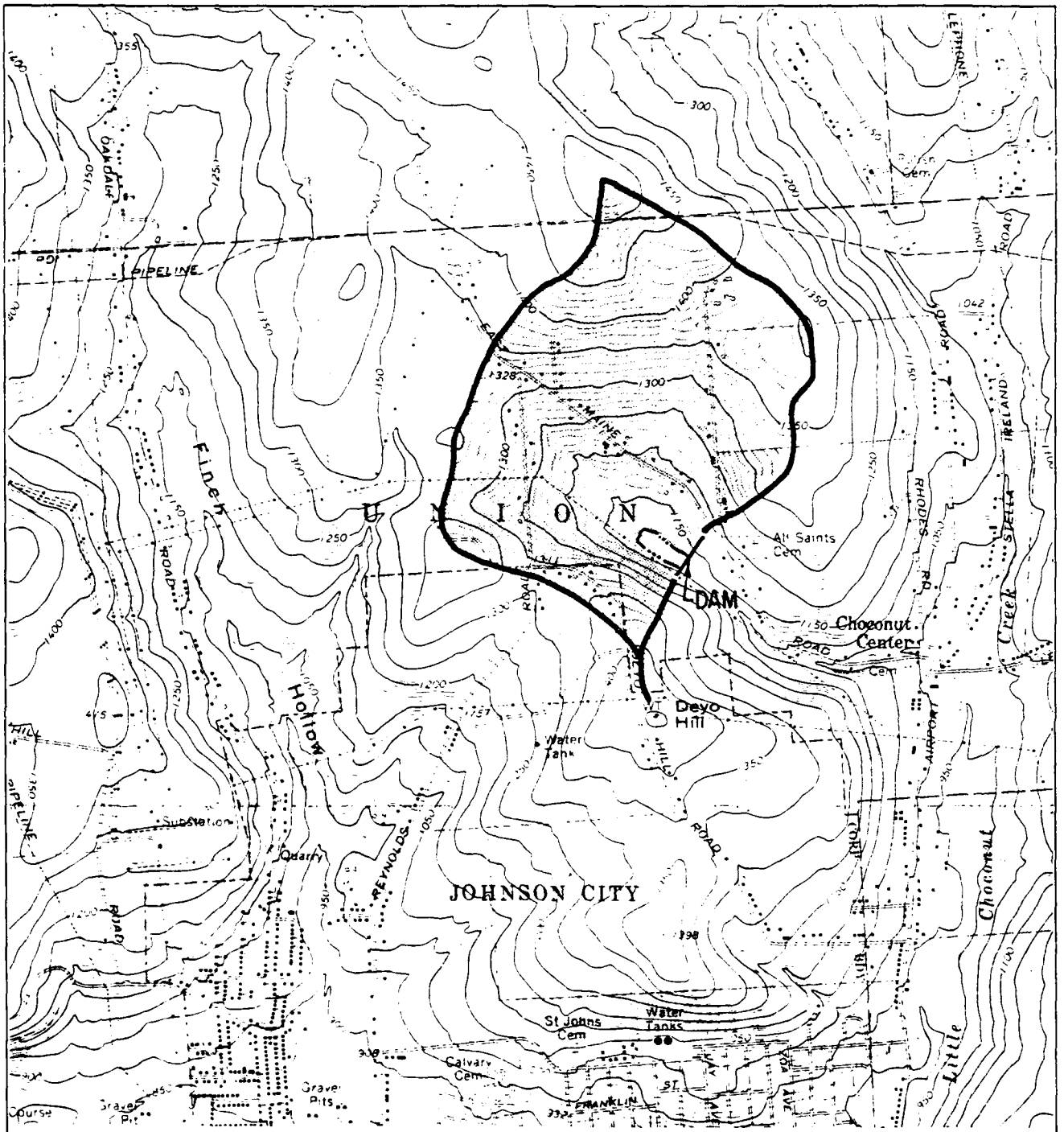
Location: Spur dike at the left end of the dam embankment

Elevation: 1148.2 to 1156.6 (NGVD)

Reservoir:

Length @ Maximum Pool 1300 ft = ¼ mile (Miles)

Length of Shoreline (@ Spillway Crest) 4250± ft = 0.8 miles (Miles)



WATERSHED MAP

LITTLE CHOCONUT WATERSHED SITE 2A DAM

INVENTORY No. NY 720

SUSQUEHANNA RIVER BASIN
BROOME COUNTY
UNION, NEW YORK

FLAHERTY · GIAVARA ASSOCIATES, P.C.

CALCULATIONS

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA NEW HAVEN CONN 06510 203/789-1280

SHEET NO. 1 OF 5
BY JGM DATE 1/29/81
CHK'D. BY PAC DATE 2/2/81

WATERSHED DATA
FOR HEC-1 SNYDER HYDROGRAPH

1) TIME TO PEAK (T_p)

$$T_p = C_T \left(\frac{L \times L_c}{\sqrt{S}} \right)^N$$ From: LINSLEY, Kohler, PAULUS

$L = 6300$ FT $= 1.19$ miles

$L_c = 2300$ FT $= 0.44$ MILES (From USGS map)

$\Delta h = 1540' - 1140' = 400'$

$$S = \frac{400'}{6300'} = 0.0635 \text{ FT/FT}$$

$C_T = 1.2$ For Steep Slopes

$$T_p = 1.2 \left(\frac{1.19 \times 0.44}{\sqrt{0.0635}} \right)^{0.38} = 1.58 \text{ HOURS}$$

2) Set $C_p = 0.625$ FOR HIGHLAND AREA

3) % IMPERVIOUS

ROADS – 12000 LF x 25' = 300,000 FT^2
houses – 50± @ 1000 FT^2 = 50,000 FT^2
350,000 FT^2
= 8 ACRES

$\frac{8 \text{ ACRES}}{406 \text{ ACRES}} = 2\%$ OF WATERSHED

4) WATERSHED AREA

406 Acres / 640 = 0.634 SQ MILES
BASED ON 1" = 2000' USGS MAP,

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA NEW HAVEN CONN 06510/203/789 1260

5) RAINFALL DATA (FROM HR #33 AS REPRINTED IN "DESIGN OF SMALL DAMS")

6 HOUR DURATION PMP = 23.5 INCHES FOR 10 SQUARE MILES

DURATION HRS	ADJ. FACTOR, %
6	100
12	110
24	120
48	127

PROJECT Corps Dams
NY 720

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA NEW HAVEN CONN 06510 203/789 1260

SHEET NO. - OF -
BY JGM DATE 1/29/81
CHK'D. BY RFG DATE 2/2/81

PRINCIPAL SPILLWAY STAGE-DISCHARGE CURVE

PRINCIPAL SPILLWAY ACTS AS AN ORIFICE

℄ ELEV. IS 1137.3
AREA = 1.2 FT^2
C = 0.6

$$Q = CA\sqrt{2GH} = CA\sqrt{2G}\,(H^{1/2})$$

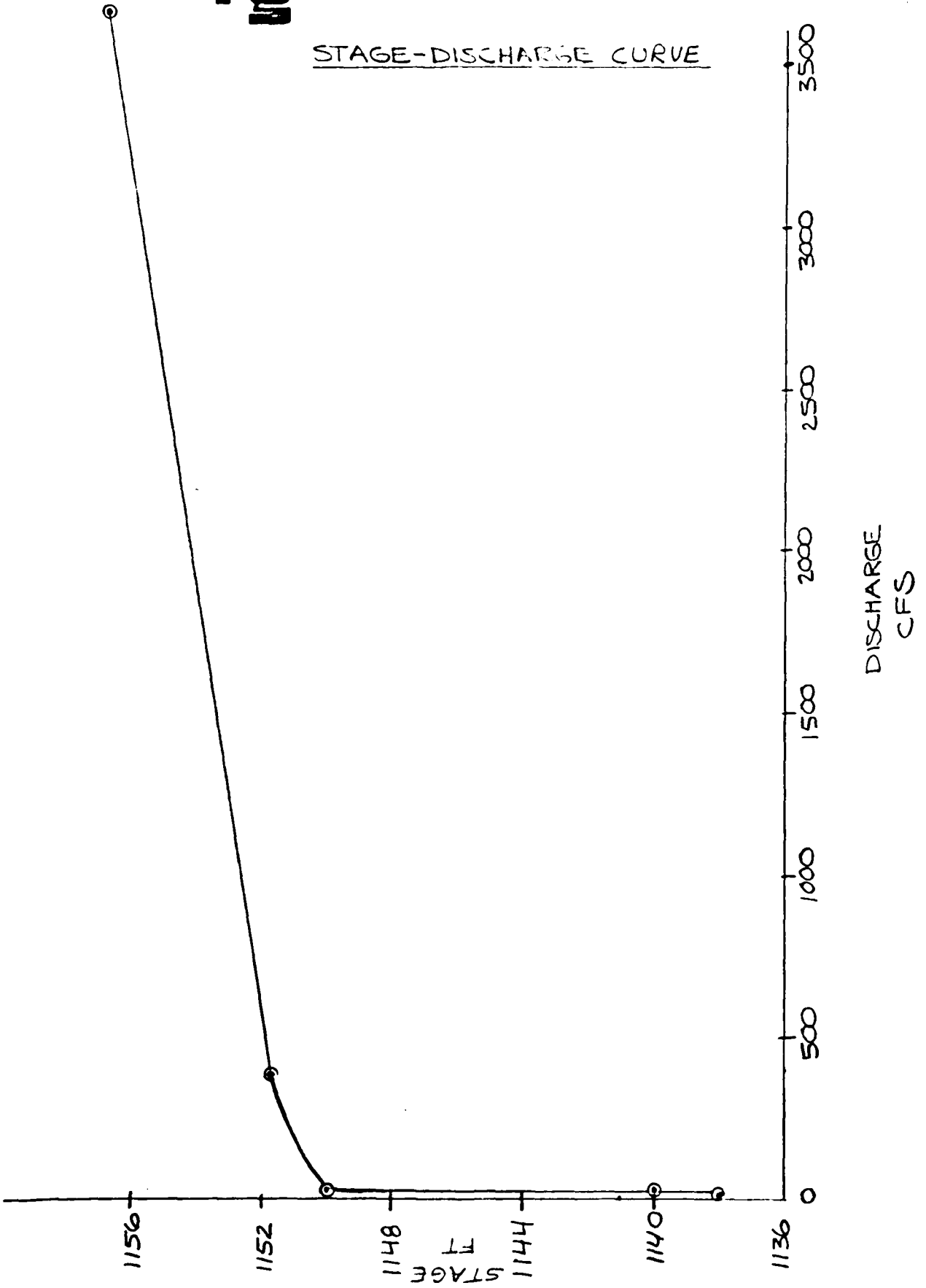
$$Q = (0.6)(1.2\,FT^2)(\sqrt{64.4})\,H^{1/2} = 5.73\,H^{1/2}$$

STAGE (FT)	HEAD, FT (STAGE - 1137.3)	DISCHARGE, CFS ($5.78\,H^{1/2}$)
1140.0	2.7	9.5
1144.0	6.7	15.0
1149.9	12.6	20.5
1151.7	14.4	21.9
1156.6	19.3	25.4
1160.0	22.7	27.5
1165.0	27.7	30.4

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA NEW HAVEN CONN 06510 203 789 1280

SHEET NO. 4 OF 5
BY. JGM DATE 11-11-81
CHK'D. BY [illegible] DATE [illegible]

STAGE-DISCHARGE CURVE



PROJECT Corps. DAMS
NY # 720

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA NEW HAVEN CONN 06510/203 789 1200

SHEET NO 5 OF 5
BY JGM DATE 1/31/81
CHK'D BY [illegible] DATE 2/2/81

EMERGENCY SPILLWAY DISCHARGE CHANNEL

$b = 80$ FT
$Z = 3:1$
$S = 3\%$
$N = 0.040$
$Q = 1990$ CFS (PMF DISCHARGE)

FIND D, A, V

$Q = \frac{K'}{N} b^{8/3} S^{1/2}$ (KINGS HANDBOOK TABLE 7-11)

$K' = \frac{1990(0.04)}{(80^{2.67})(0.03)^{0.5}} = 0.00381$

INTERPOLATE $= \frac{.00381 - .00223}{443 - 223} = 0.72$

$\frac{D}{b} = 0.02 + 0.0072 = 0.0272$

$D = 80(0.0272) = 2.18$ FT

$A = 80'(2.18') + \frac{1}{2}(2.18 \times 3 \times 2.18) \times 2$
$= 174.4 + 14.3 = 188.7$ FT^2

AVE. $Vel = \frac{Q}{A} = \frac{1990 \text{ CFS}}{188.7 \text{ FT}^2} = 10.5$ FPS

THIS VELOCITY IS MARGINAL FOR USE ON VEGETATED LININGS, SOME EROSION MAY OCCUR. REFER TO SCS TR-60.

HEC-1 FLOOD HYDROGRAPH COMPUTATIONS

```
1**********
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 **********
     1              A1  NATIONAL DAM INSPECTION PROGRAM    PHASE 1 REPORT   CORPS OF ENGINEERS
     2              A2  DAM I.D. #NY720              BITE 2A  BROOME COUNTY  NEW YORK  1/24/81
     3              A3  PREPARED BY FLAHERTY DIAVARA ASSOC. , NEW HAVEN , CONNECTICUT
     4              B    120       0       30        0        0        0        0        2        0        0
     5              B1     5
     6              J      1       9        1
     7              J1   0.1     0.2      0.3      0.4      0.5      0.6      0.7      0.8      1.0
     8              K      0       1                          0        0        1
     9              K1  INFLOW HYDROGRAPH , SNYDER METHOD
    10              N      1       1     0.63                 0        1                          1
    11              P      0    23.5      100      110      120      127
    12              T                                                          1       .1               .02
    13              W   1.58   0.625
    14              X    -2.      2.       1.
    15              K      1       1                          0        1        1        0
    16              K1  RESERVOIR ROUTING     MODIFIED PULS METHOD
    17              Y                                  1        1
    18              Y1     3                                                    8       -1
    19              Y41136.8  1140.0   1149.9   1151.7   1156.6
    20              Y5     0     9.5     19.9      388     3660
    21              $A   4.0     9.2     13.8     19.2     20.6     24.3     26.0
    22              $E1136.8  1140.0   1144.0   1149.9   1151.7   1156.6   1160.0
    23              $$1149.9
    24              $D1156.6     2.5      1.5     550.
    25              K     99
1                          PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                RUNOFF HYDROGRAPH AT          1
                                ROUTE HYDROGRAPH TO           1
                                END OF NETWORK


1**********
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 **********

 RUN  DATE: 81/02/09.
      TIME: 14.55.37.


                    NATIONAL DAM INSPECTION PROGRAM    PHASE 1 REPORT   CORPS OF ENGINEERS
```

DAM 1.D. INI/20 SITE 20 BROOME COUNTY NEW YORK 1/24/81
PREPARED BY FLAHERTY GIAVARA ASSOC. , NEW HAVEN , CONNECTICUT

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
120	0	30	0	0	0	0	2	0	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 9 LRTIO= 1

RTIOS= .10 .20 .30 .40 .50 .60 .70 .80 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH , SNYDER METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	.63	0.00	.63	1.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	23.50	100.00	110.00	120.00	127.00	0.00	0.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.10	0.00	.02

UNIT HYDROGRAPH DATA
TP= 1.58 CP= .63 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= 2.00 RTIOR= 1.00

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 3.85 AND R= 2.79 INTERVALS

UNIT HYDROGRAPH 17 END-OF-PERIOD ORDINATES, LAG= 1.58 HOURS, CP= .62 VOL= 1.00

23.	82.	139.	155.	126.	88.	61.	42.	29.	21.
14.	10.	7.	5.	3.	2.	2.			

0 END-OF-PERIOD FLOW

HO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	HO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.30	1	.00	.00	.00	1.	1.02	6.30	61	.20	.15	.05	27.
1.01	1.00	2	.00	.00	.00	1.	1.02	7.00	62	.20	.15	.05	37.
1.01	1.30	3	.00	.00	.00	1.	1.02	7.30	63	.20	.15	.05	54.
1.01	2.00	4	.00	.00	.00	1.	1.02	8.00	64	.20	.15	.05	72.
1.01	2.30	5	.00	.00	.00	1.	1.02	8.30	65	.20	.15	.05	87.
1.01	3.00	6	.00	.00	.00	1.	1.02	9.00	66	.20	.15	.05	97.
1.01	3.30	7	.00	.00	.00	1.	1.02	9.30	67	.20	.15	.05	104.
1.01	4.00	8	.00	.00	.00	1.	1.02	10.00	68	.20	.15	.05	109.
1.01	4.30	9	.00	.00	.00	1.	1.02	10.30	69	.20	.15	.05	113.
1.01	5.00	10	.00	.00	.00	1.	1.02	11.00	70	.20	.15	.05	115.
1.01	5.30	11	.00	.00	.00	1.	1.02	11.30	71	.20	.15	.05	117.
1.01	6.00	12	.00	.00	.00	1.	1.02	12.00	72	.20	.15	.05	118.
1.01	6.30	13	.01	.00	.01	1.	1.02	12.30	73	1.18	1.13	.05	141.
1.01	7.00	14	.01	.00	.01	1.	1.02	13.00	74	1.18	1.13	.05	222.
1.01	7.30	15	.01	.00	.01	1.	1.02	13.30	75	1.41	1.36	.05	364.

1.01	.00	16	.01	.00	.01	1.	1.02	14.00	76	1.41	1.36	.05	535.
1.01	8.30	17	.01	.00	.01	1.	1.02	14.30	77	1.76	1.71	.05	699.
1.01	9.00	18	.01	.00	.01	1.	1.02	15.00	78	1.76	1.71	.05	850.
1.01	9.30	19	.01	.00	.01	1.	1.02	15.30	79	2.14	2.09	.05	998.
1.01	10.00	20	.01	.00	.01	1.	1.02	16.00	80	6.79	6.74	.05	1253.
1.01	10.30	21	.01	.00	.01	1.	1.02	16.30	81	1.65	1.60	.05	1653.
1.01	11.00	22	.01	.00	.01	1.	1.02	17.00	82	1.65	1.60	.05	2000.
1.01	11.30	23	.01	.00	.01	1.	1.02	17.30	83	1.29	1.24	.05	2086.
1.01	12.00	24	.01	.00	.01	1.	1.02	18.00	84	1.29	1.24	.05	1908.
1.01	12.30	25	.07	.00	.07	1.	1.02	18.30	85	.12	.07	.05	1635.
1.01	13.00	26	.07	.00	.07	2.	1.02	19.00	86	.12	.07	.05	1347.
1.01	13.30	27	.08	.00	.08	2.	1.02	19.30	87	.12	.07	.05	1044.
1.01	14.00	28	.08	.00	.08	2.	1.02	20.00	88	.12	.07	.05	765.
1.01	14.30	29	.10	.00	.10	2.	1.02	20.30	89	.12	.07	.05	549.
1.01	15.00	30	.10	.00	.10	2.	1.02	21.00	90	.12	.07	.05	398.
1.01	15.30	31	.13	.00	.12	2.	1.02	21.30	91	.12	.07	.05	293.
1.01	16.00	32	.40	.20	.20	7.	1.02	22.00	92	.12	.07	.05	220.
1.01	16.30	33	.10	.05	.05	20.	1.02	22.30	93	.12	.07	.05	169.
1.01	17.00	34	.10	.05	.05	35.	1.02	23.00	94	.12	.07	.05	133.
1.01	17.30	35	.08	.03	.05	43.	1.02	23.30	95	.12	.07	.05	108.
1.01	18.00	36	.08	.03	.05	43.	1.03	0.00	96	.12	.07	.05	90.
1.01	18.30	37	.01	.00	.01	38.	1.03	.30	97	0.00	0.00	0.00	71.
1.01	19.00	38	.01	.00	.01	31.	1.03	1.00	98	0.00	0.00	0.00	59.
1.01	19.30	39	.01	.00	.01	24.	1.03	1.30	99	0.00	0.00	0.00	45.
1.01	20.00	40	.01	.00	.01	18.	1.03	2.00	100	0.00	0.00	0.00	31.
1.01	20.30	41	.01	.00	.01	13.	1.03	2.30	101	0.00	0.00	0.00	21.
1.01	21.00	42	.01	.00	.01	9.	1.03	3.00	102	0.00	0.00	0.00	15.
1.01	21.30	43	.01	.00	.01	7.	1.03	3.30	103	0.00	0.00	0.00	11.
1.01	22.00	44	.01	.00	.01	5.	1.03	4.00	104	0.00	0.00	0.00	8.
1.01	22.30	45	.01	.00	.01	4.	1.03	4.30	105	0.00	0.00	0.00	6.
1.01	23.00	46	.01	.00	.01	3.	1.03	5.00	106	0.00	0.00	0.00	4.
1.01	23.30	47	.01	.00	.01	3.	1.03	5.30	107	0.00	0.00	0.00	3.
1.02	0.00	48	.01	.00	.01	2.	1.03	6.00	108	0.00	0.00	0.00	3.
1.02	.30	49	.08	.03	.05	2.	1.03	6.30	109	0.00	0.00	0.00	2.
1.02	1.00	50	.08	.03	.05	5.	1.03	7.00	110	0.00	0.00	0.00	2.
1.02	1.30	51	.08	.03	.05	9.	1.03	7.30	111	0.00	0.00	0.00	2.
1.02	2.00	52	.08	.03	.05	13.	1.03	8.00	112	0.00	0.00	0.00	2.
1.02	2.30	53	.08	.03	.05	17.	1.03	8.30	113	0.00	0.00	0.00	2.
1.02	3.00	54	.08	.03	.05	19.	1.03	9.00	114	0.00	0.00	0.00	2.
1.02	3.30	55	.08	.03	.05	21.	1.03	9.30	115	0.00	0.00	0.00	2.
1.02	4.00	56	.08	.03	.05	22.	1.03	10.00	116	0.00	0.00	0.00	2.
1.02	4.30	57	.08	.03	.05	23.	1.03	10.30	117	0.00	0.00	0.00	2.
1.02	5.00	58	.08	.03	.05	24.	1.03	11.00	118	0.00	0.00	0.00	2.
1.02	5.30	59	.08	.03	.05	24.	1.03	11.30	119	0.00	0.00	0.00	2.
1.02	6.00	60	.08	.03	.05	24.	1.03	12.00	120	0.00	0.00	0.00	2.
									SUM	29.84	26.21	3.64	21356.
										(758.)	(666.)	(92.)	(604.73)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2086.	1347.	435.	178.	21360.
CMS	59.	38.	12.	5.	605.
INCHES		19.89	25.70	26.28	26.28
MM		505.19	652.90	667.59	667.59
AC-FT		668.	863.	883.	883.
THOUS CU M		824.	1065.	1089.	1089.

1*DVF*

STATION 1

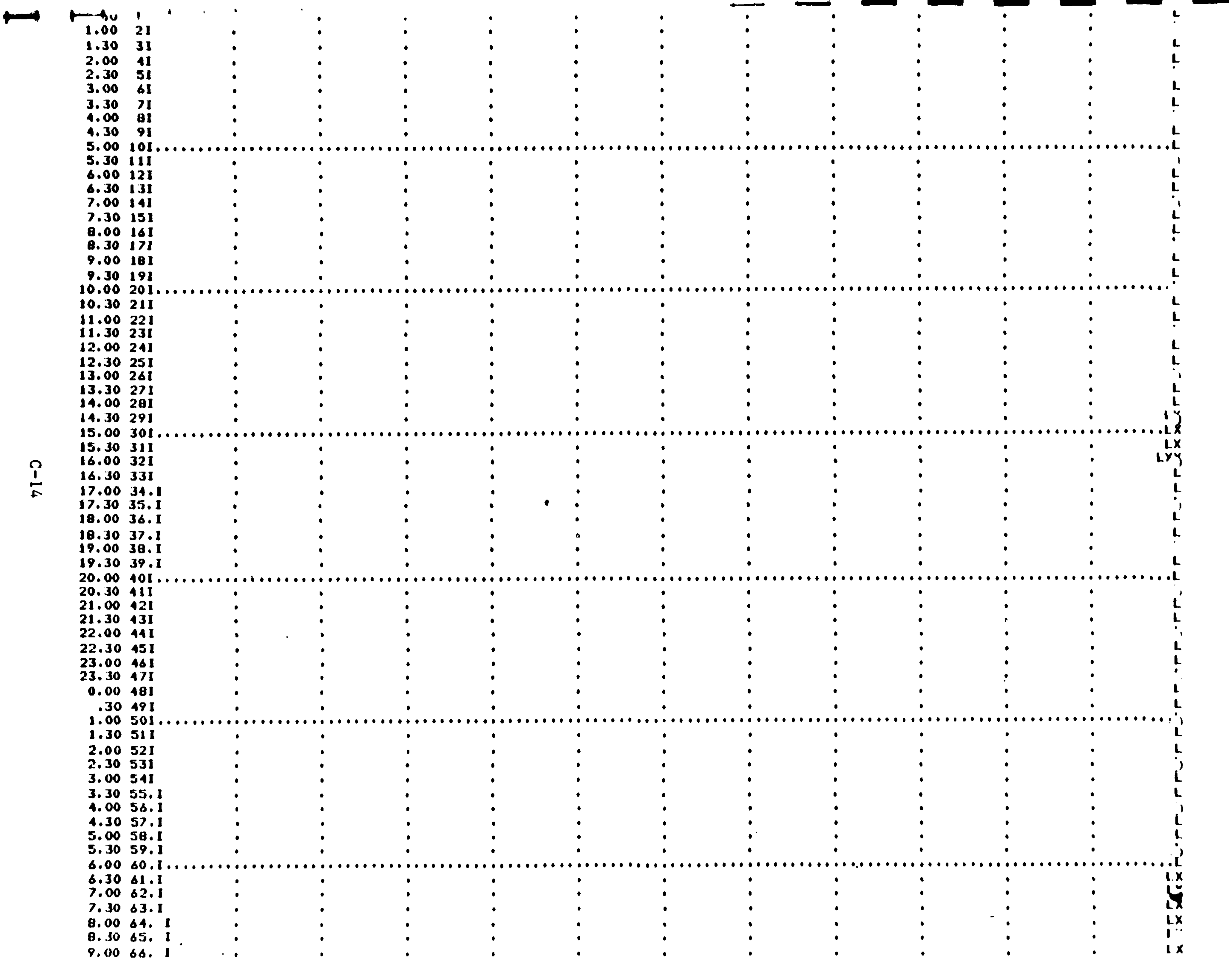
INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

0. 400. 800. 1200. 1600. 2000. 2400.

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PRECIP(L) AND EXCESS(X

0.	0.	0.	0.	0.	0.	0.	0.	8.	6.	4.	2.


1.00 2I
1.30 3I
2.00 4I
2.30 5I
3.00 6I
3.30 7I
4.00 8I
4.30 9I
5.00 10I
5.30 11I
6.00 12I
6.30 13I
7.00 14I
7.30 15I
8.00 16I
8.30 17I
9.00 18I
9.30 19I
10.00 20I
10.30 21I
11.00 22I
11.30 23I
12.00 24I
12.30 25I
13.00 26I
13.30 27I
14.00 28I
14.30 29I
15.00 30I
15.30 31I
16.00 32I
16.30 33I
17.00 34.I
17.30 35.I
18.00 36.I
18.30 37.I
19.00 38.I
19.30 39.I
20.00 40I
20.30 41I
21.00 42I
21.30 43I
22.00 44I
22.30 45I
23.00 46I
23.30 47I
0.00 48I
.30 49I
1.00 50I
1.30 51I
2.00 52I
2.30 53I
3.00 54I
3.30 55.I
4.00 56.I
4.30 57.I
5.00 58.I
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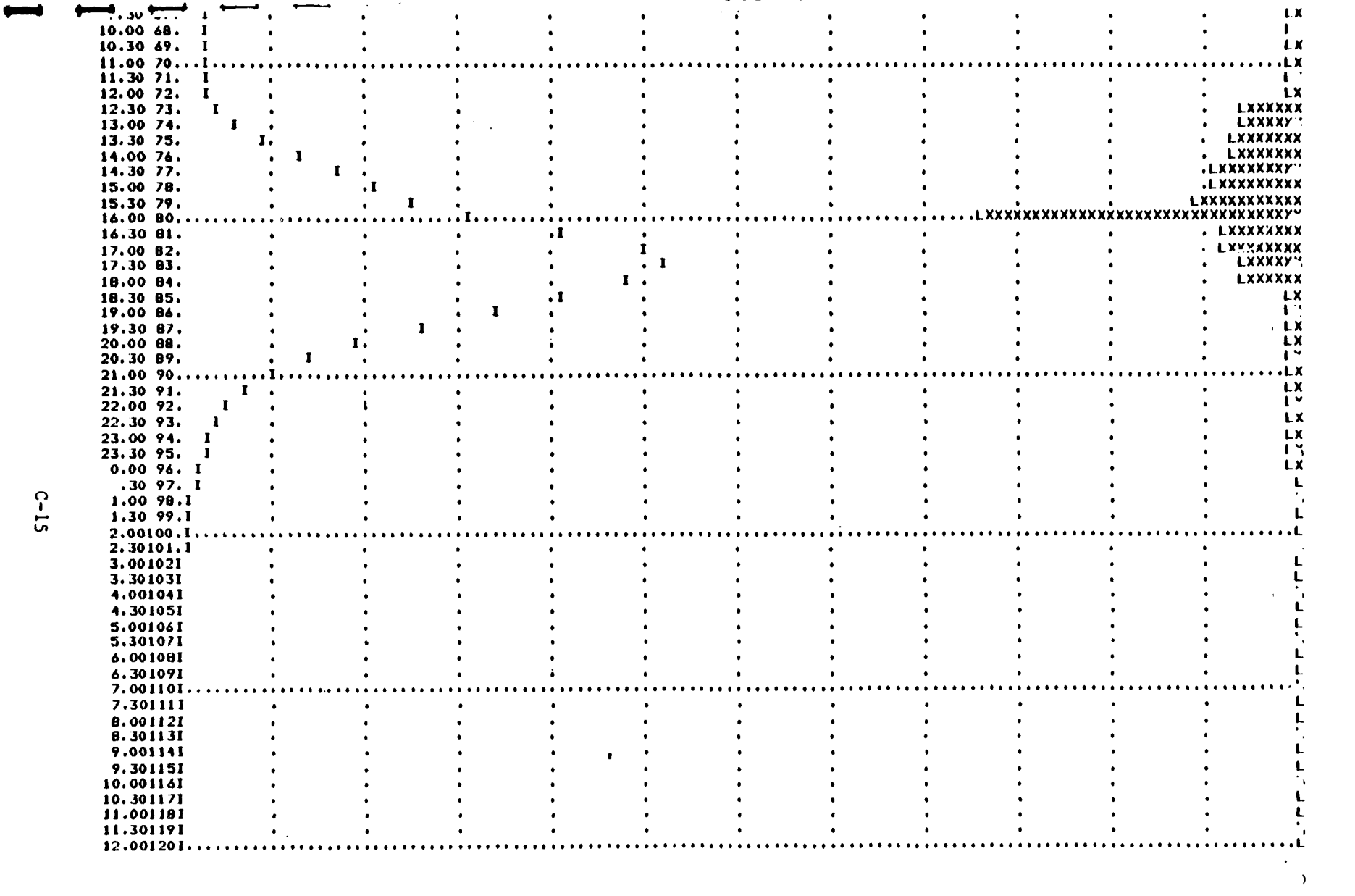


1*DVN*

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	2.	3.	4.	4.	4.	3.	2.	2.
1.	1.	1.	1.	0.	0.	0.	0.	0.	0.
1.	1.	2.	2.	2.	2.	2.	2.	2.	2.

3.	4.	5.	7.	9.	10.	10.	11.	11.	11.
12.	12.	14.	22.	36.	54.	70.	85.	100.	125.
165.	200.	209.	191.	163.	135.	104.	76.	55.	40.
29.	22.	17.	13.	11.	9.	7.	6.	4.	3.
2.	1.	1.	1.	1.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	209.	135.	44.	18.	2136.
CMS	6.	4.	1.	1.	60.
INCHES		1.99	2.57	2.63	2.63
MM		50.52	65.29	66.76	66.76
AC-FT		67.	86.	88.	88.
THOUS CU M		82.	106.	109.	109.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	4.	7.	9.	9.	8.	6.	5.	4.
3.	2.	1.	1.	1.	1.	1.	0.	0.	1.
2.	3.	3.	4.	4.	4.	5.	5.	5.	5.
5.	7.	11.	14.	17.	19.	21.	22.	23.	23.
23.	24.	28.	44.	73.	107.	140.	170.	200.	251.
331.	400.	417.	382.	327.	269.	209.	153.	110.	80.
59.	44.	34.	27.	22.	18.	14.	12.	9.	6.
4.	3.	2.	2.	1.	1.	1.	1.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	417.	269.	87.	36.	4272.
CMS	12.	8.	2.	1.	121.
INCHES		3.98	5.14	5.26	5.26
MM		101.04	130.58	133.52	133.52
AC-FT		134.	173.	177.	177.
THOUS CU M		165.	213.	218.	218.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	2.	6.	10.	13.	13.	11.	9.	7.	5.
4.	3.	2.	2.	1.	1.	1.	1.	1.	1.
3.	4.	5.	6.	6.	7.	7.	7.	7.	7.
8.	11.	16.	22.	26.	29.	31.	33.	34.	34.
35.	35.	42.	67.	109.	161.	210.	255.	299.	376.
496.	600.	626.	572.	490.	404.	313.	229.	165.	119.
88.	66.	51.	40.	32.	27.	21.	18.	13.	9.
6.	4.	3.	2.	2.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	626.	404.	131.	53.	6408.
CMS	18.	11.	4.	2.	181.
INCHES		5.97	7.71	7.88	7.88
MM		151.56	195.87	200.28	200.28
AC-FT		200.	259.	265.	265.
THOUS CU M		247.	319.	327.	327.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	3.	8.	14.	17.	17.	15.	13.	10.	7.
5.	4.	3.	2.	2.	1.	1.	1.	1.	2.
3.	5.	7.	8.	8.	9.	9.	9.	10.	10.
11.	15.	21.	29.	35.	39.	42.	44.	45.	46.
47.	47.	57.	89.	146.	214.	280.	340.	399.	501.
661.	800.	835.	763.	654.	539.	418.	306.	220.	159.
117.	88.	67.	53.	43.	36.	28.	23.	18.	12.
8.	6.	4.	3.	2.	2.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	835.	539.	174.	71.	8544.
CMS	24.	15.	5.	2.	242.
INCHES		7.96	10.28	10.51	10.51
MM		202.08	261.16	267.04	267.04
AC-FT		267.	345.	353.	353.
THOUS CU M		330.	426.	435.	435.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 5

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	4.	10.	17.	22.	22.	16.	12.	9.	
6.	5.	3.	3.	2.	2.	1.	1.	2.	
4.	7.	8.	10.	11.	11.	12.	12.	12.	
14.	19.	27.	36.	43.	48.	52.	55.	56.	57.
58.	59.	71.	111.	182.	268.	350.	425.	499.	627.
827.	1000.	1043.	954.	817.	674.	522.	382.	275.	199.
146.	110.	84.	66.	54.	45.	35.	29.	22.	16.
10.	7.	5.	4.	3.	2.	2.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1043.	674.	218.	89.	10680.
CMS	30.	19.	6.	3.	302.
INCHES		9.94	12.85	13.14	13.14
MM		252.60	326.45	333.79	333.79
AC-FT		334.	432.	441.	441.
THOUS CU M		412.	532.	544.	544.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 6

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	4.	12.	21.	26.	26.	23.	19.	15.	11.
8.	6.	4.	3.	2.	2.	2.	1.	1.	3.
5.	8.	10.	12.	13.	13.	14.	14.	14.	15.
16.	22.	32.	43.	52.	58.	62.	65.	68.	69.
70.	71.	85.	133.	218.	321.	420.	510.	599.	752.
992.	1200.	1252.	1145.	981.	808.	626.	459.	329.	239.
176.	132.	101.	80.	65.	54.	42.	35.	27.	19.
12.	9.	6.	5.	3.	3.	2.	2.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1252.	808.	261.	107.	12816.
CMS	35.	23.	7.	3.	363.
INCHES		11.93	15.42	15.77	15.77
MM		303.12	391.74	400.55	400.55

AC-FT		401.	518.	530.		530.			
THOUS CU M		494.	639.	653.		653.			

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 7

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	2.
2.	5.	14.	24.	30.	30.	27.	22.	17.	12.
9.	6.	5.	4.	3.	2.	2.	2.	2.	3.
6.	9.	12.	13.	15.	16.	16.	17.	17.	17.
19.	26.	37.	50.	61.	68.	73.	76.	79.	80.
82.	82.	99.	155.	255.	375.	490.	595.	698.	877.
1157.	1400.	1461.	1336.	1144.	943.	731.	535.	384.	279.
205.	154.	118.	93.	75.	63.	49.	41.	31.	22.
15.	10.	7.	5.	4.	3.	2.	2.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1461.	943.	305.	125.	14952.
CMS	41.	27.	9.	4.	423.
INCHES		13.92	17.99	18.40	18.40
MM		353.64	457.03	467.31	467.31
AC-FT		468.	604.	618.	618.
THOUS CU M		577.	745.	762.	762.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 8

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	2.	2.	2.
2.	6.	16.	28.	35.	34.	30.	25.	19.	14.
10.	7.	5.	4.	3.	3.	2.	2.	2.	4.
7.	10.	13.	15.	17.	18.	19.	19.	19.	20.
22.	30.	43.	57.	69.	78.	83.	87.	90.	92.
93.	94.	113.	177.	291.	428.	560.	680.	798.	1002.
1323.	1600.	1669.	1527.	1308.	1078.	835.	612.	439.	318.
234.	176.	135.	106.	86.	72.	57.	47.	36.	25.
17.	12.	8.	6.	4.	3.	3.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1669.	1078.	348.	142.	17088.
CMS	47.	31.	10.	4.	484.
INCHES		15.91	20.56	21.03	21.03
MM		404.15	522.32	534.07	534.07
AC-FT		534.	691.	706.	706.
THOUS CU M		659.	852.	871.	871.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 9

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	2.	2.
2.	7.	20.	35.	43.	43.	38.	31.	24.	18.
13.	9.	7.	5.	4.	3.	3.	2.	2.	5.
9.	13.	17.	19.	21.	22.	23.	24.	24.	24.
27.	37.	54.	72.	87.	97.	104.	109.	113.	115.
117.	118.	141.	229.	364.	535.	699.	850.	998.	1253.
1653.	2000.	2086.	1908.	1635.	1347.	1044.	765.	549.	398.
293.	220.	169.	133.	108.	90.	71.	59.	45.	31.
21.	15.	11.	8.	6.	4.	3.	3.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2086.	1347.	435.	178.	21360.
CMS	59.	38.	12.	5.	605.
INCHES		19.89	25.70	26.28	26.28
MM		505.19	652.90	667.59	667.59
AC-FT		668.	863.	883.	883.
THOUS CU M		824.	1065.	1089.	1089.

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

RESERVOIR ROUTING MODIFIED PULS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	1	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
3	0	0	0.000	0.000	0.000	8.	-1

STAGE	1136.80	1140.00	1149.90	1151.70	1156.60		
FLOW	0.00	9.50	19.90	388.00	3660.00		
SURFACE AREA=	4.	9.	14.	19.	21.	24.	26.
CAPACITY=	0.	21.	66.	163.	199.	309.	394.
ELEVATION=	1137.	1140.	1144.	1150.	1152.	1157.	1160.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1149.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1156.6	2.5	1.5	550.

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	3.	3.	3.	3.
3.	3.	4.	4.	4.	5.	6.	7.	9.	10.
10.	11.	12.	12.	13.	13.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	13.	13.

STORAGE

6.	6.	6.	5.	5.	5.	5.	5.	5.	5.
5.	5.	4.	4.	4.	4.	4.	4.	4.	4.

4.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	4.	4.	4.	5.	5.
5.	6.	6.	7.	8.	9.	12.	14.	18.	22.
28.	35.	43.	51.	57.	63.	67.	71.	73.	74.
75.	75.	76.	76.	76.	75.	75.	75.	74.	74.
73.	73.	72.	72.	71.	71.	70.	70.	69.	69.
68.	67.	67.	66.	66.	65.	65.	64.	64.	63.

STAGE

1138.0	1138.0	1138.0	1137.9	1137.9	1137.9	1137.9	1137.9	1137.8	1137.8
1137.8	1137.8	1137.7	1137.7	1137.7	1137.7	1137.7	1137.7	1137.6	1137.6
1137.6	1137.6	1137.6	1137.5	1137.5	1137.5	1137.5	1137.5	1137.5	1137.5
1137.4	1137.4	1137.4	1137.4	1137.4	1137.5	1137.5	1137.5	1137.5	1137.5
1137.5	1137.5	1137.5	1137.5	1137.5	1137.4	1137.4	1137.4	1137.4	1137.4
1137.4	1137.4	1137.4	1137.4	1137.4	1137.4	1137.4	1137.4	1137.4	1137.4
1137.4	1137.4	1137.4	1137.5	1137.5	1137.6	1137.6	1137.7	1137.8	1137.8
1137.9	1138.0	1138.0	1138.1	1138.3	1138.6	1138.9	1139.3	1139.7	1140.2
1140.8	1141.4	1142.2	1142.8	1143.3	1143.8	1144.1	1144.3	1144.5	1144.6
1144.6	1144.7	1144.7	1144.7	1144.7	1144.6	1144.6	1144.6	1144.6	1144.6
1144.5	1144.5	1144.4	1144.4	1144.4	1144.3	1144.3	1144.2	1144.2	1144.2
1144.1	1144.1	1144.0	1144.0	1144.0	1143.9	1143.9	1143.8	1143.8	1143.8

PEAK OUTFLOW IS 14. AT TIME 47.00 HOURS

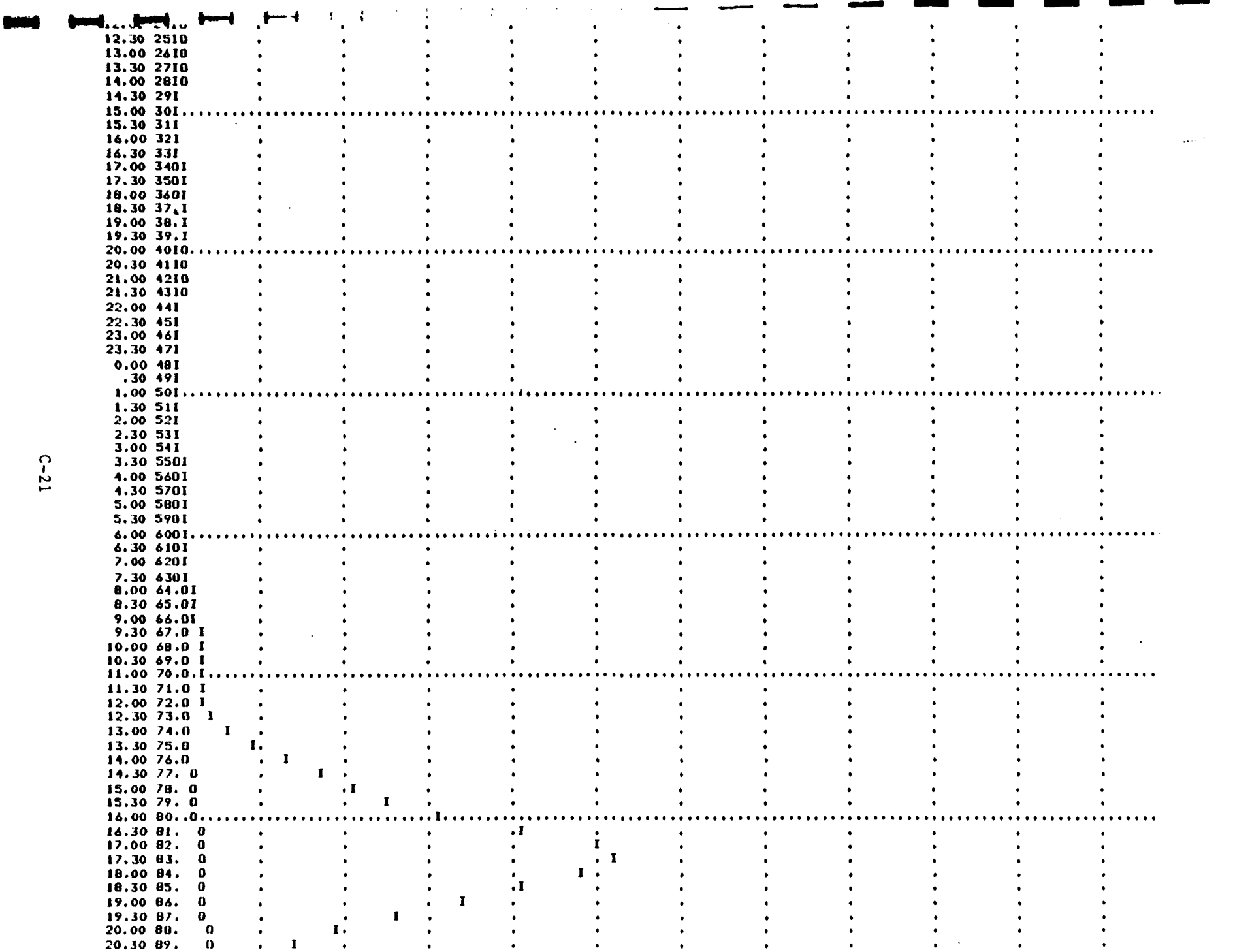
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	14.	14.	12.	6.	757.
CMS	0.	0.	0.	0.	21.
INCHES		.21	.73	.93	.93
MM		5.38	18.54	23.66	23.66
AC-FT		7.	25.	31.	31.
THOUS CU M		9.	30.	39.	39.

1*DVF*

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

```
      0.        40.       80.       120.      160.      200.      240.      0.        0.        0.        0.        0.
 .30  110 .         .         .         .         .         .         .         .         .         .         .         .
1.00  210 .         .         .         .         .         .         .         .         .         .         .         .
1.30  310 .         .         .         .         .         .         .         .         .         .         .         .
2.00  410 .         .         .         .         .         .         .         .         .         .         .         .
2.30  510 .         .         .         .         .         .         .         .         .         .         .         .
3.00  610 .         .         .         .         .         .         .         .         .         .         .         .
3.30  710 .         .         .         .         .         .         .         .         .         .         .         .
4.00  810 .         .         .         .         .         .         .         .         .         .         .         .
4.30  910 .         .         .         .         .         .         .         .         .         .         .         .
5.00 1010.....................................................................................................................
5.30 1110 .         .         .         .         .         .         .         .         .         .         .         .
6.00 1210 .         .         .         .         .         .         .         .         .         .         .         .
6.30 1310 .         .         .         .         .         .         .         .         .         .         .         .
7.00 1410 .         .         .         .         .         .         .         .         .         .         .         .
7.30 1510 .         .         .         .         .         .         .         .         .         .         .         .
8.00 1610 .         .         .         .         .         .         .         .         .         .         .         .
8.30 1710 .         .         .         .         .         .         .         .         .         .         .         .
9.00 1810 .         .         .         .         .         .         .         .         .         .         .         .
9.30 1910 .         .         .         .         .         .         .         .         .         .         .         .
10.00 2010.....................................................................................................................
10.30 2110 .         .         .         .         .         .         .         .         .         .         .         .
11.00 2210 .         .         .         .         .         .         .         .         .         .         .         .
11.30 2310 .         .         .         .         .         .         .         .         .         .         .         .
```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13.00 2610
13.30 2710
14.00 2810
14.30 291
15.00 301
15.30 311
16.00 321
16.30 331
17.00 3401
17.30 3501
18.00 3601
18.30 37.1
19.00 38.1
19.30 39.1
20.00 4010
20.30 4110
21.00 4210
21.30 4310
22.00 441
22.30 451
23.00 461
23.30 471
0.00 481
.30 491
1.00 501
1.30 511
2.00 521
2.30 531
3.00 541
3.30 5501
4.00 5601
4.30 5701
5.00 5801
5.30 5901
6.00 6001
6.30 6101
7.00 6201
7.30 6301
8.00 64.01
8.30 65.01
9.00 66.01
9.30 67.0 I
10.00 68.0 I
10.30 69.0 I
11.00 70.0 I
11.30 71.0 I
12.00 72.0 I
12.30 73.0 I
13.00 74.0 I
13.30 75.0 I
14.00 76.0 I
14.30 77. 0 I
15.00 78. 0 I
15.30 79. 0 I
16.00 80. 0 I
16.30 81. 0 I
17.00 82. 0 I
17.30 83. 0 I
18.00 84. 0 I
18.30 85. 0 I
19.00 86. 0 I
19.30 87. 0 I
20.00 88. 0 I
20.30 89. 0 I

1*0VN*

STATION 1, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	3.	3.	3.
3.	3.	3.	3.	3.	3.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	3.	3.	3.	3.
3.	3.	3.	3.	3.	4.	4.	4.	5.	5.
5.	6.	6.	7.	7.	9.	10.	10.	11.	12.
13.	14.	15.	16.	17.	18.	18.	19.	19.	19.
19.	19.	20.	20.	20.	20.	20.	20.	20.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.

STORAGE

6.	6.	6.	6.	5.	5.	5.	5.	5.	5.
5.	5.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	5.	5.	6.	6.	7.	8.	8.	9.
10.	10.	11.	13.	15.	18.	23.	29.	36.	45.
56.	71.	87.	103.	117.	128.	138.	144.	149.	152.
154.	155.	156.	157.	157.	157.	157.	156.	156.	156.
155.	154.	154.	153.	152.	151.	151.	150.	149.	148.

148.	147.	146.	145.	145.	144.	143.	142.	142.	141.
				STAGE					
1138.0	1138.0	1138.0	1138.0	1137.9	1137.9	1137.9	1137.9	1137.8	1137.8
1137.8	1137.8	1137.8	1137.7	1137.7	1137.7	1137.7	1137.7	1137.6	1137.6
1137.6	1137.6	1137.6	1137.6	1137.5	1137.5	1137.5	1137.5	1137.5	1137.5
1137.5	1137.5	1137.5	1137.5	1137.5	1137.6	1137.6	1137.7	1137.7	1137.7
1137.7	1137.7	1137.7	1137.7	1137.7	1137.7	1137.6	1137.6	1137.6	1137.6
1137.6	1137.6	1137.6	1137.6	1137.6	1137.6	1137.6	1137.7	1137.7	1137.7
1137.7	1137.7	1137.8	1137.9	1138.0	1138.1	1138.2	1138.3	1138.4	1138.5
1138.6	1138.7	1138.9	1139.0	1139.3	1139.7	1140.2	1140.9	1141.5	1142.3
1143.3	1144.3	1145.4	1146.5	1147.3	1148.0	1148.5	1148.9	1149.1	1149.3
1149.4	1149.5	1149.5	1149.6	1149.6	1149.6	1149.6	1149.5	1149.5	1149.5
1149.5	1149.4	1149.4	1149.4	1149.3	1149.3	1149.2	1149.2	1149.2	1149.1
1149.1	1149.0	1149.0	1149.0	1148.9	1148.9	1148.8	1148.8	1148.7	1148.7

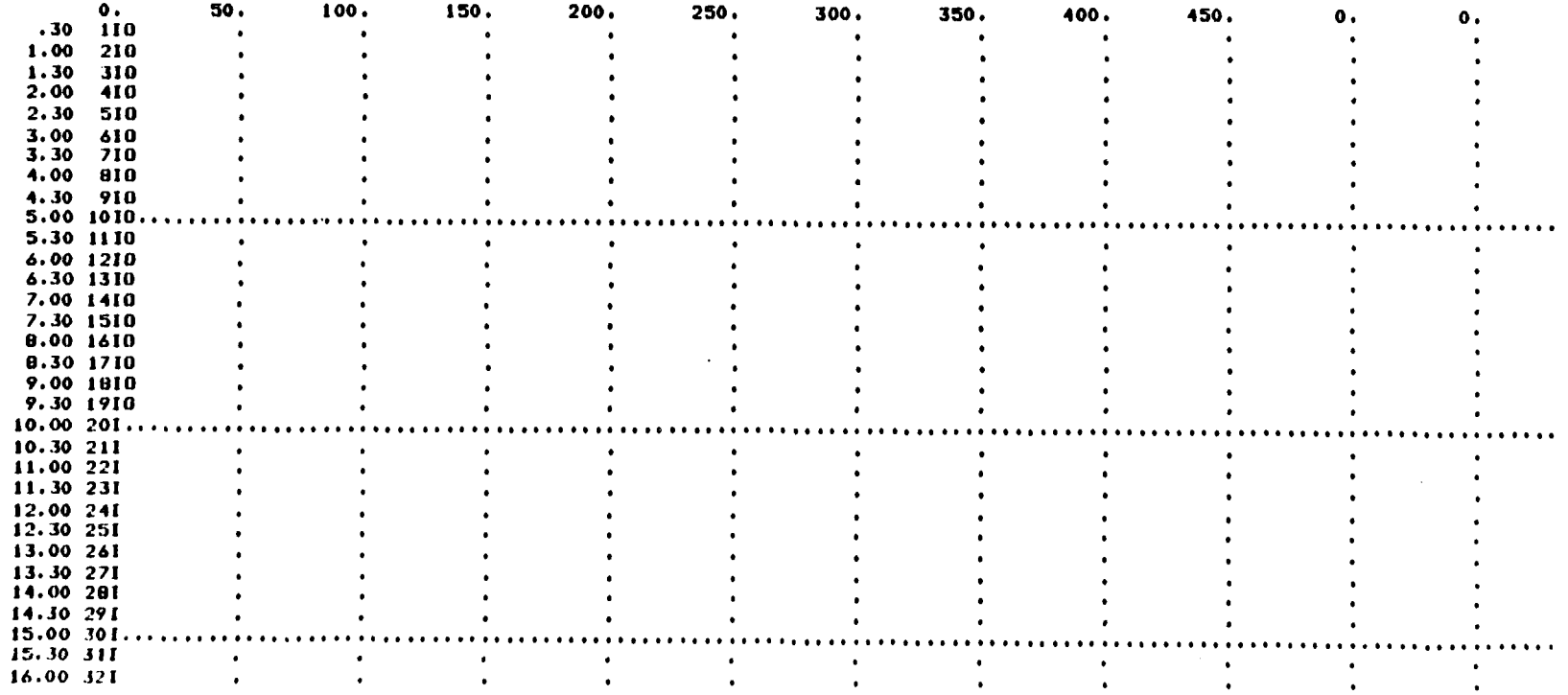
PEAK OUTFLOW IS 20. AT TIME 48.00 HOURS

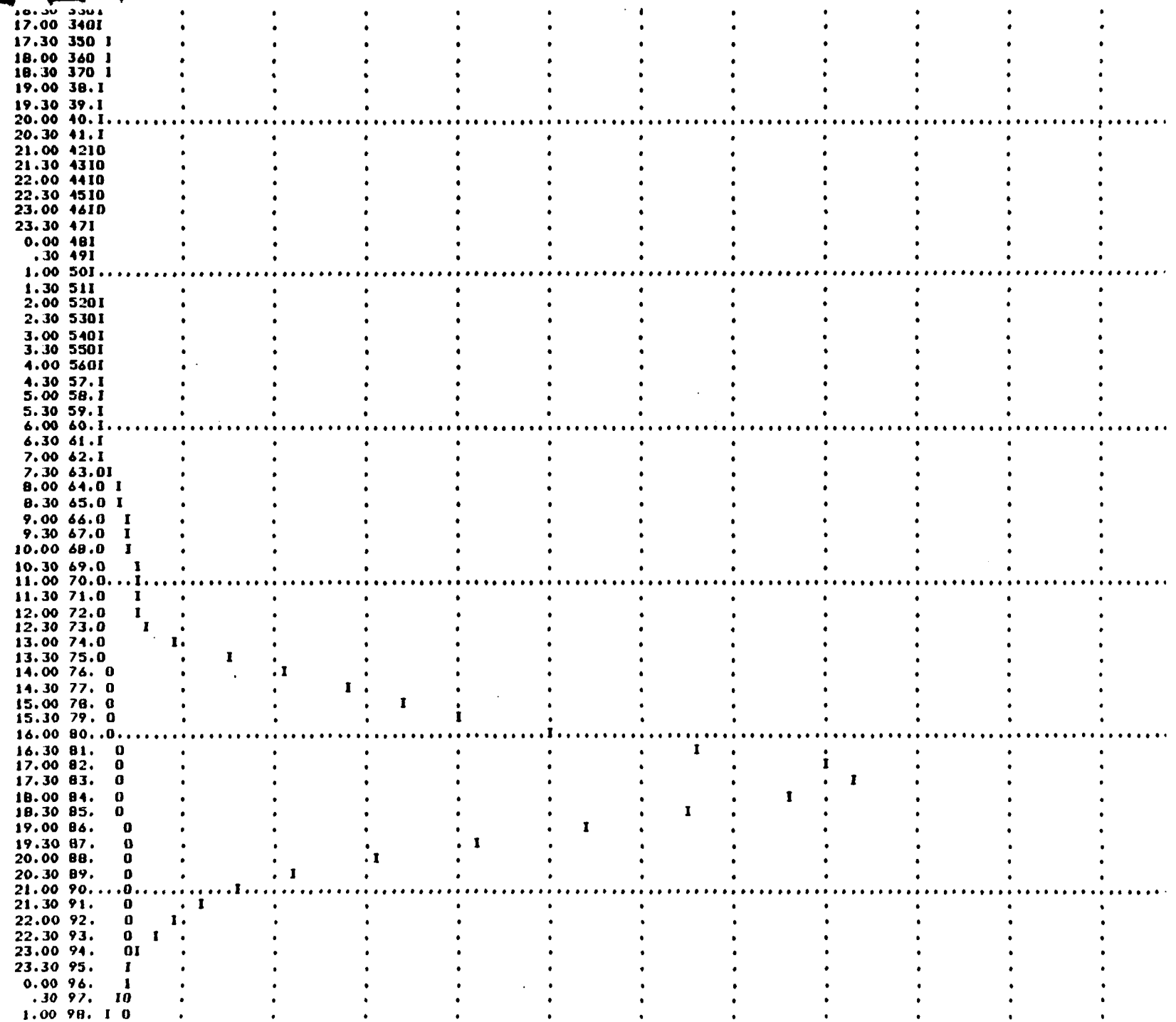
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	20.	19.	17.	8.	1010.
CMS	1.	1.	0.	0.	29.
INCHES		.29	1.00	1.24	1.24
MM		7.31	25.35	31.58	31.58
AC-FT		10.	34.	42.	42.
THOUS CU M		12.	41.	51.	51.

1*DVF*

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)




17.00 340I
17.30 350 I
18.00 360 I
18.30 370 I
19.00 38.I
19.30 39.I
20.00 40.I
20.30 41.I
21.00 4210
21.30 4310
22.00 4410
22.30 4510
23.00 4610
23.30 471
0.00 481
.30 491
1.00 501
1.30 511
2.00 5201
2.30 5301
3.00 5401
3.30 5501
4.00 5601
4.30 57.I
5.00 58.I
5.30 59.I
6.00 60.I
6.30 61.I
7.00 62.I
7.30 63.0I
8.00 64.0 I
8.30 65.0 I
9.00 66.0 I
9.30 67.0 I
10.00 68.0 I
10.30 69.0 I
11.00 70.0 I
11.30 71.0 I
12.00 72.0 I
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15.30 79. 0 I
16.00 80. 0 I
16.30 81. 0 I
17.00 82. 0 I
17.30 83. 0 I
18.00 84. 0 I
18.30 85. 0 I
19.00 86. 0 I
19.30 87. 0 I
20.00 88. 0 I
20.30 89. 0 I
21.00 90. 0 I
21.30 91. 0 I
22.00 92. 0 I
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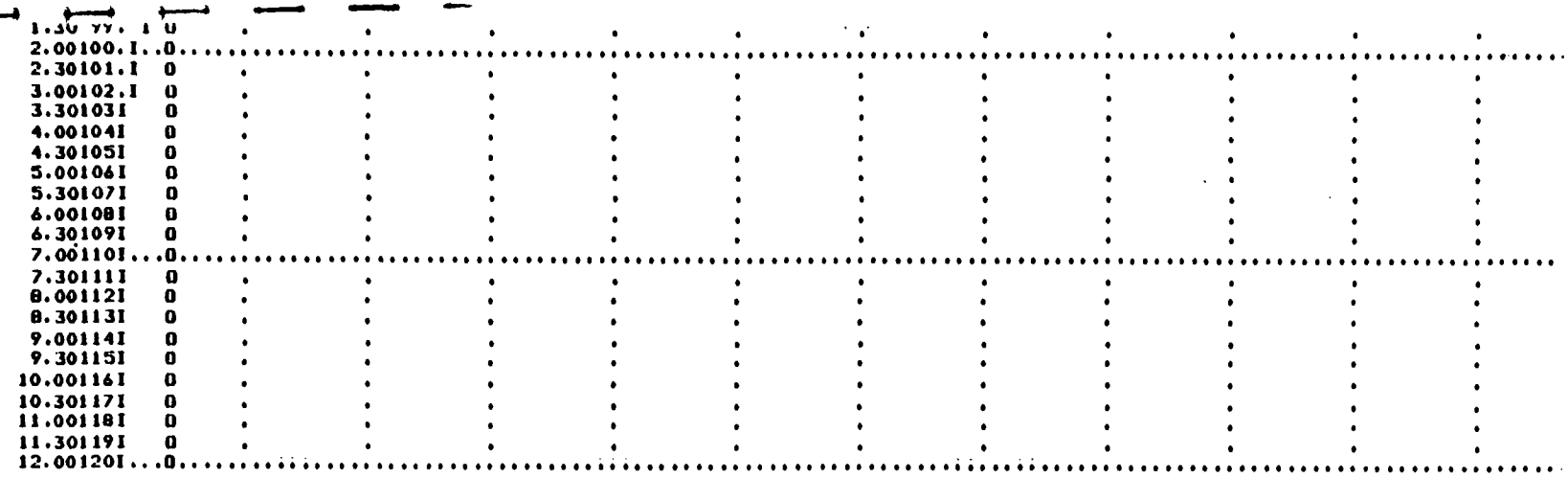


$$OVN$

STATION 1, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	4.
4.	4.	4.	4.	5.	5.	6.	6.	6.	7.
7.	8.	8.	9.	10.	10.	11.	12.	13.	14.
15.	17.	18.	19.	139.	247.	286.	281.	252.	214.
175.	140.	111.	88.	69.	55.	44.	35.	28.	22.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.

STORAGE

6.	6.	6.	6.	5.	5.	5.	5.	5.	5.
5.	5.	5.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	4.	4.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	6.	6.
6.	6.	6.	7.	8.	9.	10.	11.	12.	13.
14.	15.	17.	19.	22.	27.	34.	43.	54.	68.
85.	107.	132.	156.	174.	185.	189.	188.	185.	182.
178.	175.	172.	170.	168.	166.	165.	165.	164.	163.
163.	162.	162.	161.	160.	159.	159.	158.	157.	156.
156.	155.	154.	153.	152.	152.	151.	150.	149.	149.

STAGE

1138.0	1138.0	1138.0	1138.0	1137.9	1137.9	1137.9	1137.9	1137.8	1137.8
1137.8	1137.8	1137.8	1137.8	1137.7	1137.7	1137.7	1137.7	1137.7	1137.6
1137.6	1137.6	1137.6	1137.6	1137.6	1137.6	1137.5	1137.5	1137.5	1137.5
1137.5	1137.5	1137.5	1137.6	1137.6	1137.7	1137.8	1137.8	1137.9	1137.9
1137.9	1137.9	1137.9	1137.9	1137.9	1137.9	1137.8	1137.8	1137.8	1137.8
1137.8	1137.8	1137.8	1137.8	1137.8	1137.9	1137.9	1137.9	1138.0	1138.0

1138.0	1138.1	1138.1	1138.2	1138.4	1138.5	1138.7	1138.8	1139.0	1139.1
1139.3	1139.4	1139.6	1139.8	1140.1	1140.7	1141.4	1142.2	1143.1	1144.1
1145.3	1146.7	1148.2	1149.5	1150.5	1151.0	1151.2	1151.2	1151.0	1150.8
1150.7	1150.5	1150.3	1150.2	1150.1	1150.1	1150.0	1150.0	1149.9	1149.9
1149.9	1149.9	1149.8	1149.8	1149.7	1149.7	1149.7	1149.6	1149.6	1149.5
1149.5	1149.5	1149.4	1149.4	1149.3	1149.3	1149.3	1149.2	1149.2	1149.1

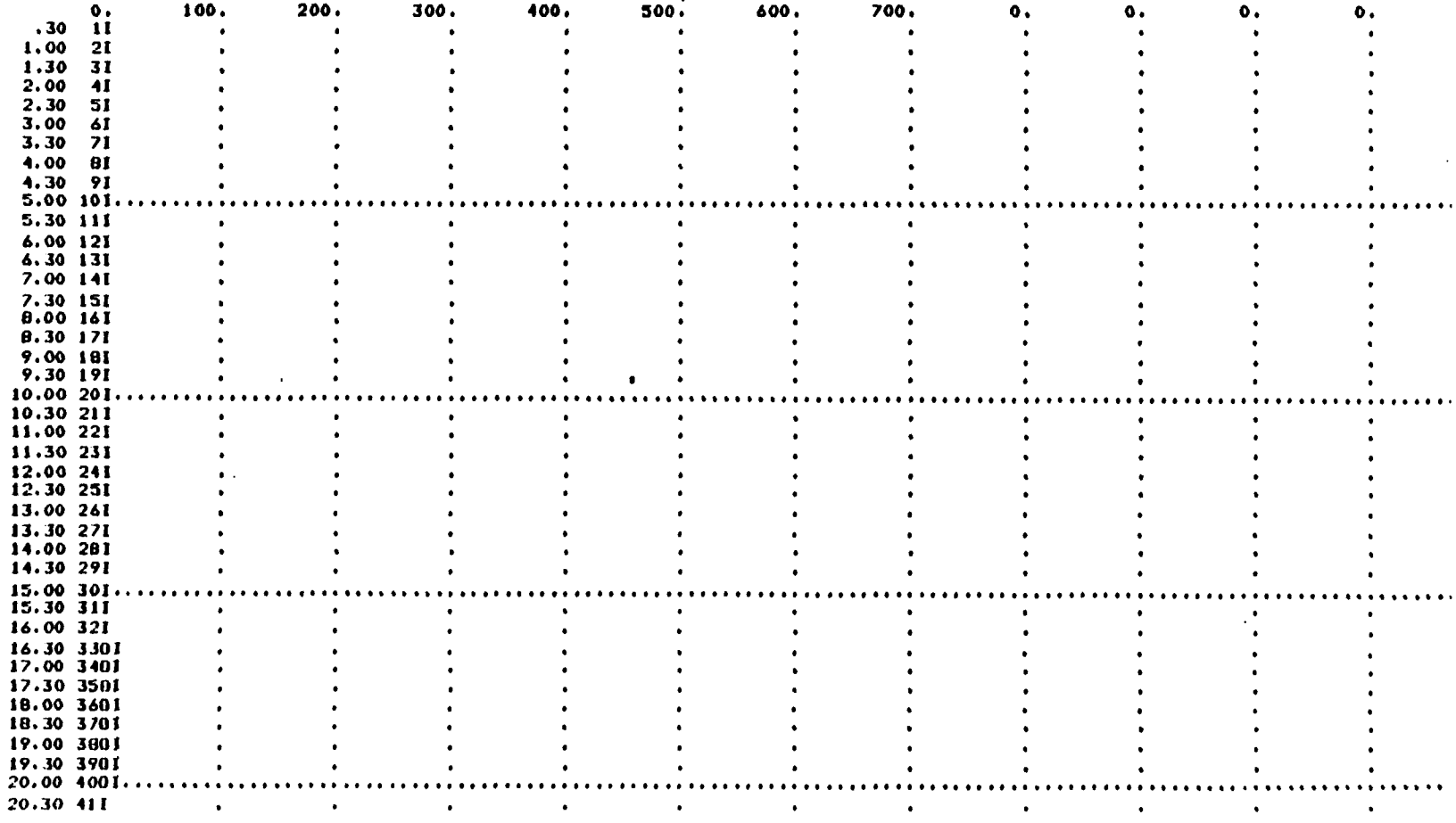
PEAK OUTFLOW IS 286. AT TIME 43.50 HOURS

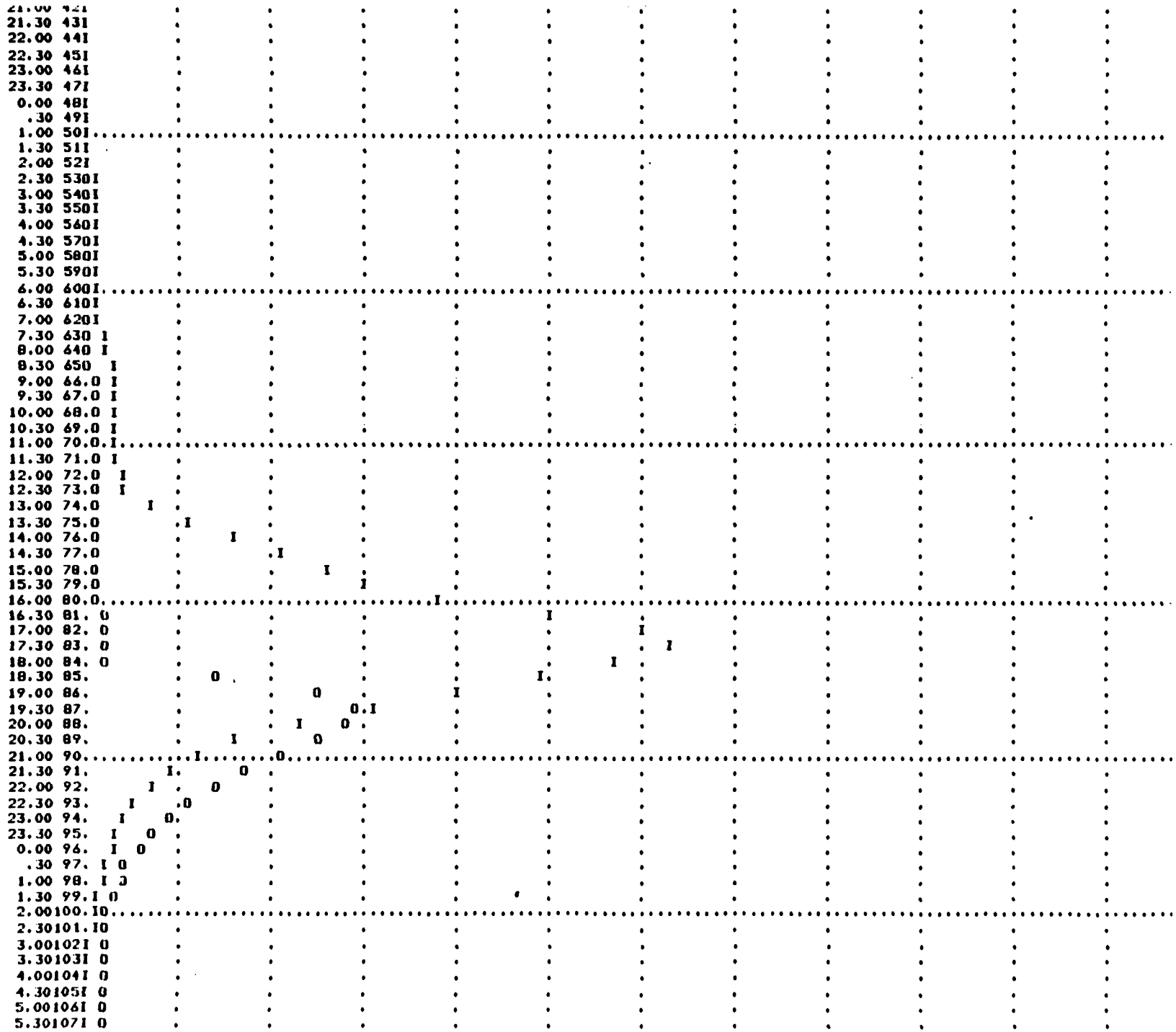
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	286.	170.	57.	25.	2958.
CMS	8.	5.	2.	1.	84.
INCHES		2.51	3.35	3.64	3.64
MM		63.74	85.20	92.46	92.46
AC-FT		84.	113.	122.	122.
THOUS CU M		104.	139.	151.	151.

1*DVF*

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

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3.00 541
3.30 551
4.00 561
4.30 571
5.00 581
5.30 591
6.00 601
6.30 611
7.00 621
7.30 630
8.00 640
8.30 650
9.00 66.0
9.30 67.0
10.00 68.0
10.30 69.0
11.00 70.0
11.30 71.0
12.00 72.0
12.30 73.0
13.00 74.0
13.30 75.0
14.00 76.0
14.30 77.0
15.00 78.0
15.30 79.0
16.00 80.0
16.30 81.
17.00 82.
17.30 83.
18.00 84.
18.30 85.
19.00 86.
19.30 87.
20.00 88.
20.30 89.
21.00 90.
21.30 91.
22.00 92.
22.30 93.
23.00 94.
23.30 95.
0.00 96.
.30 97.
1.00 98.
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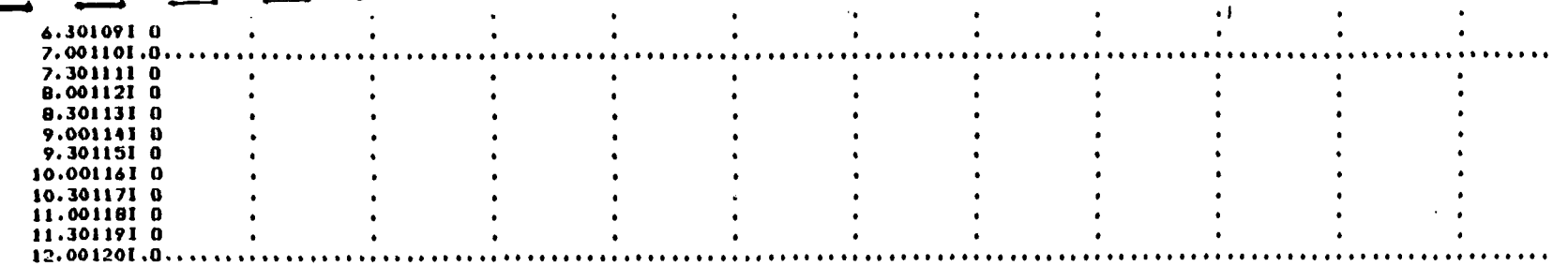
3.30103
4.00104
4.30105
5.00106
5.30107



1*OVN*

STATION 1, PLAN 1, RATIO 4

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	4.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	3.	3.	3.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	5.	5.	5.	6.	6.	7.	7.	8.	8.
9.	10.	10.	10.	10.	11.	12.	13.	14.	15.
17.	19.	138.	368.	613.	600.	503.	390.	345.	292.
238.	191.	151.	119.	94.	74.	59.	47.	38.	30.
23.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	19.	19.	19.	19.	19.	19.	19.	19.	19.

STORAGE

6.	6.	6.	6.	5.	5.	5.	5.	5.	5.
5.	5.	5.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	3.	3.	3.	3.
3.	3.	3.	4.	4.	5.	5.	6.	6.	6.
6.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	6.	7.	7.	7.	7.
7.	8.	8.	9.	10.	12.	13.	14.	16.	17.
19.	21.	22.	25.	29.	36.	46.	58.	73.	91.
114.	144.	174.	197.	206.	206.	203.	199.	195.	189.
184.	179.	176.	173.	170.	168.	167.	166.	165.	164.
163.	163.	162.	162.	161.	160.	159.	159.	158.	157.
156.	156.	155.	154.	153.	153.	152.	151.	150.	149.

STAGE

1138.0	1138.0	1138.0	1138.0	1137.9	1137.9	1137.9	1137.9	1137.9	1137.8
1137.8	1137.8	1137.8	1137.8	1137.7	1137.7	1137.7	1137.7	1137.7	1137.7
1137.6	1137.6	1137.6	1137.6	1137.6	1137.6	1137.6	1137.6	1137.5	1137.5
1137.5	1137.5	1137.5	1137.6	1137.7	1137.8	1137.9	1138.0	1138.1	1138.1
1138.1	1138.1	1138.1	1138.1	1138.1	1138.1	1138.0	1138.0	1138.0	1138.0
1138.0	1138.0	1138.0	1138.0	1138.1	1138.1	1138.1	1138.2	1138.2	1138.2
1138.3	1138.3	1138.4	1138.6	1138.7	1138.9	1139.1	1139.3	1139.5	1139.7
1139.8	1140.0	1140.2	1140.5	1140.9	1141.6	1142.4	1143.4	1144.5	1145.7
1147.2	1148.9	1150.5	1151.6	1152.0	1152.0	1151.9	1151.7	1151.5	1151.2
1151.0	1150.7	1150.5	1150.4	1150.3	1150.2	1150.1	1150.0	1150.0	1149.9
1149.9	1149.9	1149.9	1149.8	1149.8	1149.7	1149.7	1149.7	1149.6	1149.6
1149.5	1149.5	1149.5	1149.4	1149.4	1149.3	1149.3	1149.3	1149.2	1149.2

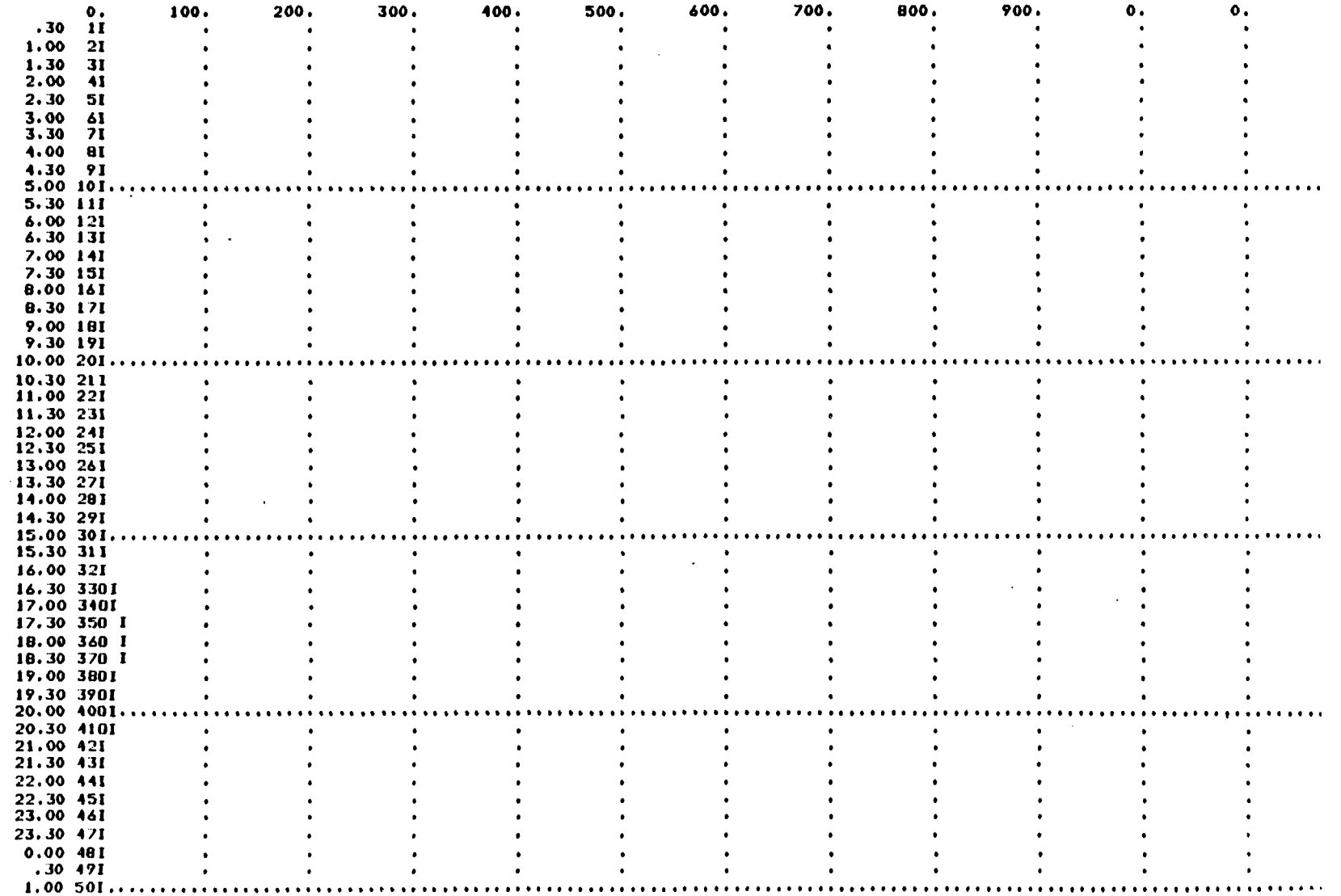
PEAK OUTFLOW IS 613. AT TIME 42.50 HOURS

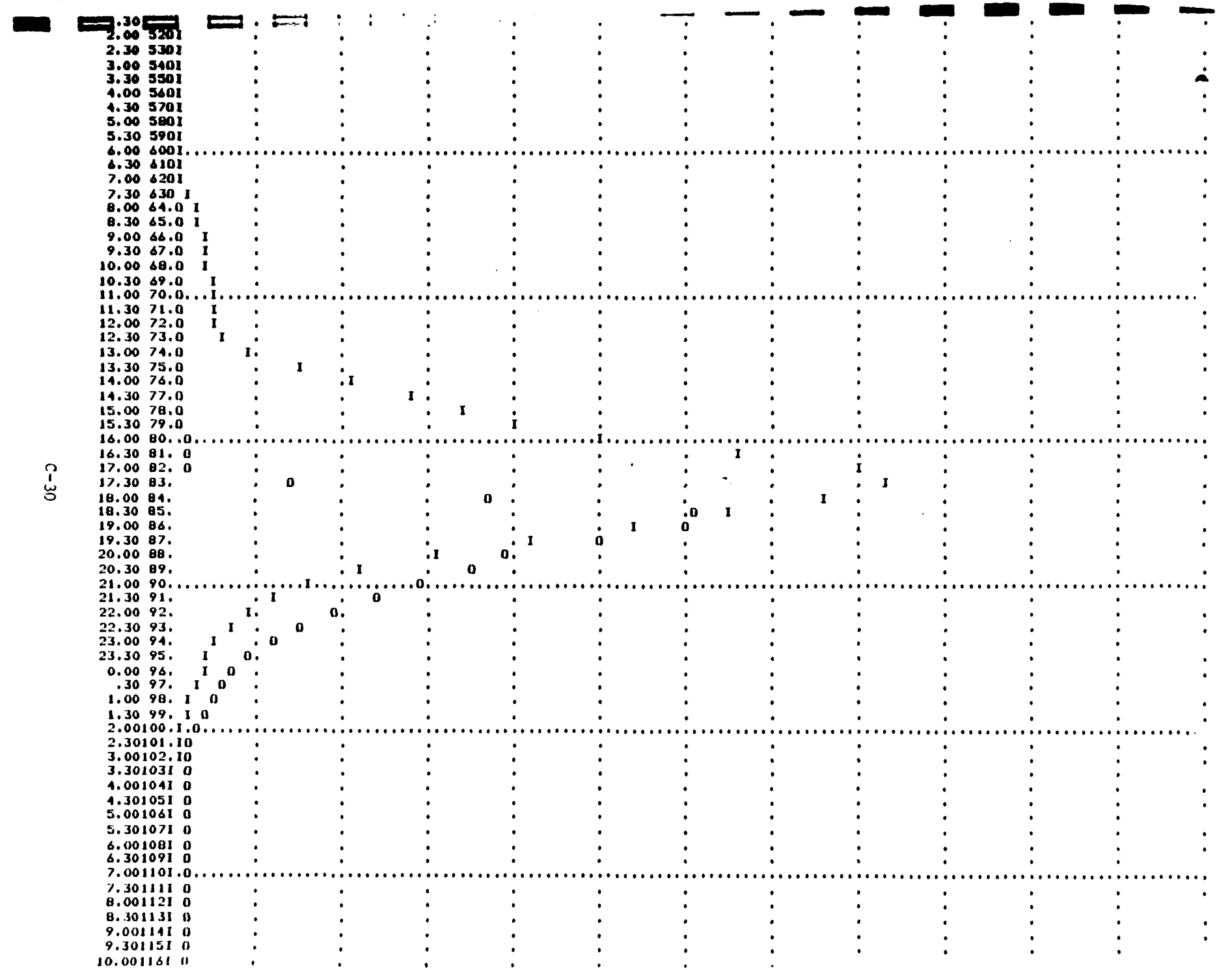
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	613.	327.	100.	42.	5073.
CMS	17.	9.	3.	1.	144.
INCHES		4.83	5.92	6.24	6.24
MM		122.69	150.34	158.56	158.56
AC-FT		162.	199.	210.	210.
THOUS CU M		200.	245.	259.	259.

1*0VF*

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

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3.30 550I
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4.30 570I
5.00 580I
5.30 590I
6.00 600I
6.30 610I
7.00 620I
7.30 630 I
8.00 64.0 I
8.30 65.0 I
9.00 66.0 I
9.30 67.0 I
10.00 68.0 I
10.30 69.0 I
11.00 70.0 I
11.30 71.0 I
12.00 72.0 I
12.30 73.0 I
13.00 74.0 I
13.30 75.0 I
14.00 76.0 I
14.30 77.0 I
15.00 78.0 I
15.30 79.0 I
16.00 80. 0 I
16.30 81. 0 I
17.00 82. 0 I
17.30 83. 0 I
18.00 84. 0 I
18.30 85. 0 I
19.00 86. I 0
19.30 87. I 0
20.00 88. I 0
20.30 89. I 0
21.00 90. I 0
21.30 91. I 0
22.00 92. I 0
22.30 93. I 0
23.00 94. I 0
23.30 95. I 0
0.00 96. I 0
.30 97. I 0
1.00 98. I 0
1.30 99. I 0
2.00100.I 0
2.30101.I 0
3.00102.I 0
3.30103I 0
4.00104I 0
4.30105I 0
5.00106I 0
5.30107I 0
6.00108I 0
6.30109I 0
7.00110I 0
7.30111I 0
8.00112I 0
8.30113I 0
9.00114I 0
9.30115I 0
10.00116I 0

```
10.301178 0
11.001181 0
11.301191 0
12.001201.0.....
```

1OVN

STATION 1, PLAN 1, RATIO 5

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	4.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	3.	3.	3.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	5.	5.	5.	5.	5.
5.	5.	6.	6.	7.	7.	8.	9.	9.	10.
10.	10.	10.	11.	11.	12.	13.	14.	16.	17.
19.	172.	568.	910.	891.	776.	635.	489.	376.	329.
275.	224.	179.	143.	113.	91.	73.	58.	47.	37.
28.	21.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	19.	19.	19.	19.	19.	19.	19.	19.

STORAGE

6.	6.	6.	6.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	3.	3.
3.	3.	4.	4.	5.	5.	6.	7.	7.	7.
7.	8.	8.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	8.	8.	8.	9.	9.
9.	10.	10.	11.	13.	14.	16.	18.	20.	22.
24.	26.	28.	31.	37.	46.	58.	73.	92.	115.
144.	178.	205.	215.	215.	211.	207.	202.	198.	193.
188.	183.	178.	175.	172.	170.	168.	167.	166.	165.
164.	163.	163.	162.	161.	161.	160.	159.	158.	158.
157.	156.	155.	155.	154.	153.	152.	152.	151.	150.

STAGE

1138.0	1138.0	1138.0	1138.0	1137.9	1137.9	1137.9	1137.9	1137.9	1137.8
1137.8	1137.8	1137.8	1137.8	1137.8	1137.7	1137.7	1137.7	1137.7	1137.7
1137.7	1137.7	1137.6	1137.6	1137.6	1137.6	1137.6	1137.6	1137.6	1137.6
1137.5	1137.5	1137.6	1137.7	1137.8	1137.9	1138.1	1138.2	1138.2	1138.3
1138.3	1138.3	1138.3	1138.3	1138.3	1138.3	1138.2	1138.2	1138.2	1138.2
1138.2	1138.2	1138.2	1138.2	1138.3	1138.3	1138.4	1138.4	1138.5	1138.5
1138.5	1138.6	1138.7	1138.9	1139.1	1139.3	1139.5	1139.7	1139.9	1140.1
1140.3	1140.6	1140.8	1141.1	1141.6	1142.4	1143.4	1144.5	1145.8	1147.2
1148.9	1150.6	1152.0	1152.5	1152.5	1152.3	1152.1	1151.9	1151.6	1151.4
1151.1	1150.9	1150.7	1150.5	1150.4	1150.2	1150.2	1150.1	1150.0	1150.0
1149.9	1149.9	1149.9	1149.8	1149.8	1149.8	1149.7	1149.7	1149.7	1149.6
1149.6	1149.5	1149.5	1149.5	1149.4	1149.4	1149.3	1149.3	1149.3	1149.2

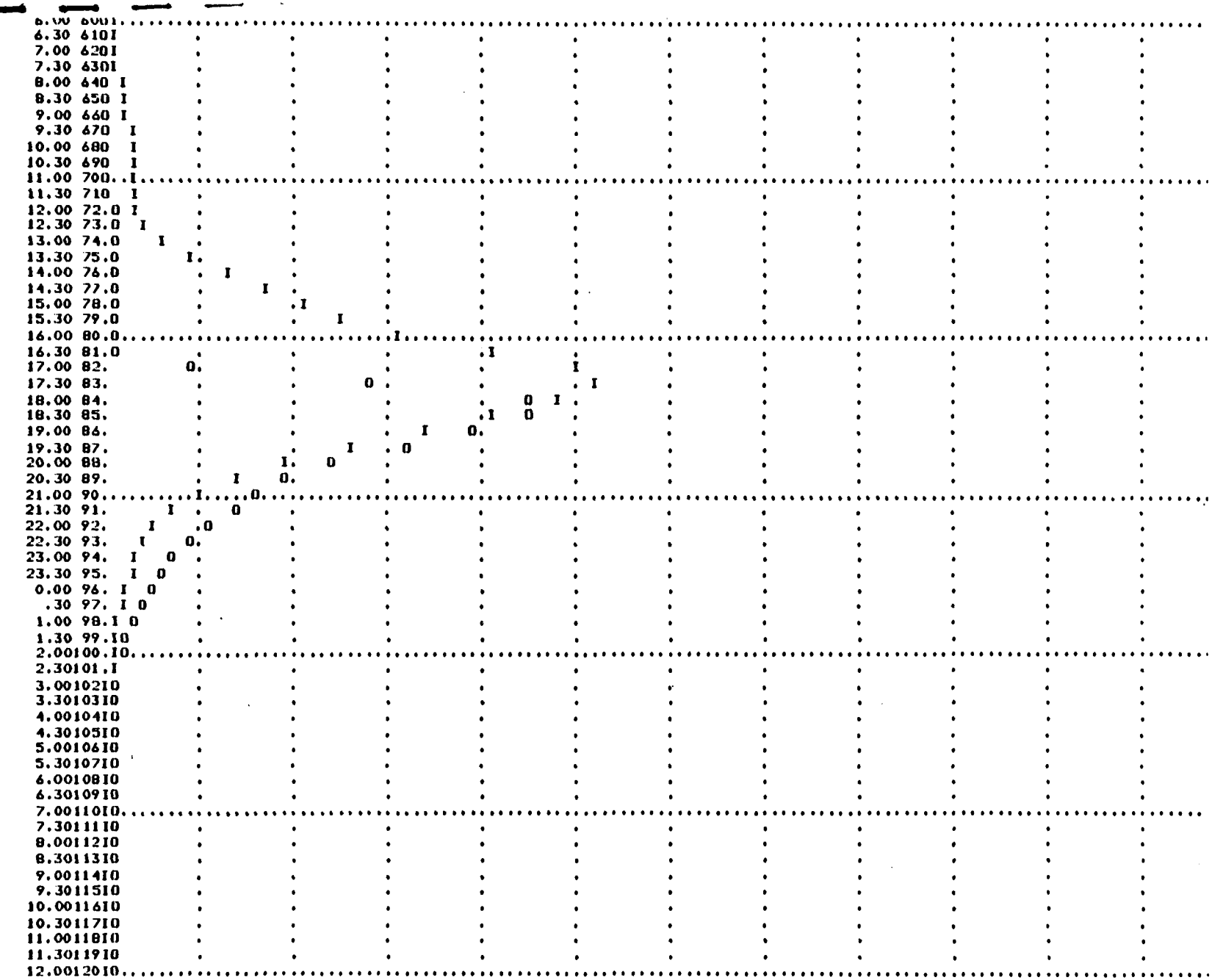
PEAK OUTFLOW IS 910. AT TIME 42.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	910.	484.	144.	60.	7193.
CMS	26.	14.	4.	2.	204.
INCHES		7.15	8.49	8.85	8.85
MM		181.52	215.73	224.82	224.82
AC-FT		240.	285.	297.	297.
THOUS CU M		296.	352.	367.	367.

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

	0.	200.	400.	600.	800.	1000.	1200.	0.	0.	0.	0.	0.
.00	1I											
1.00	2I											
1.30	3I											
2.00	4I											
2.30	5I											
3.00	6I											
3.30	7I											
4.00	8I											
4.30	9I											
5.00	10I											
5.30	11I											
6.00	12I											
6.30	13I											
7.00	14I											
7.30	15I											
8.00	16I											
8.30	17I											
9.00	18I											
9.30	19I											
10.00	20I											
10.30	21I											
11.00	22I											
11.30	23I											
12.00	24I											
12.30	25I											
13.00	26I											
13.30	27I											
14.00	28I											
14.30	29I											
15.00	30I											
15.30	31I											
16.00	32I											
16.30	33I											
17.00	340I											
17.30	350I											
18.00	360I											
18.30	370I											
19.00	380I											
19.30	390I											
20.00	40I											
20.30	41I											
21.00	42I											
21.30	43I											
22.00	44I											
22.30	45I											
23.00	46I											
23.30	47I											
0.00	48I											
.30	49I											
1.00	50I											
1.30	51I											
2.00	52I											
2.30	53I											
3.00	54I											
3.30	550I											
4.00	560I											
4.30	570I											
5.00	580I											
5.30	590I											


6.00 600I
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7.00 620I
7.30 630I
8.00 640 I
8.30 650 I
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9.30 670 I
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10.30 690 I
11.00 700..I
11.30 710 I
12.00 72.0 I
12.30 73.0 I
13.00 74.0 I
13.30 75.0 I.
14.00 76.0 .I
14.30 77.0 .I
15.00 78.0 .I
15.30 79.0 .I
16.00 80.0.....I
16.30 81.0 .I
17.00 82. 0. .I
17.30 83. .0 .I
18.00 84. .0 I
18.30 85. .I 0
19.00 86. .I 0.
19.30 87. .I .0
20.00 88. .I. 0
20.30 89. .I 0.
21.00 90.....I.....0.....
21.30 91. I . 0
22.00 92. I .0
22.30 93. I 0.
23.00 94. I 0
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11.3011910
12.0012010.....

I$0VN$

STATION 17 FLOW AT RATIO 6

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	4.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	2.	2.	2.	2.	2.	2.
2.	2.	2.	3.	3.	4.	4.	4.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	6.	6.
6.	6.	7.	7.	8.	8.	9.	10.	10.	10.
10.	11.	11.	11.	12.	13.	14.	15.	17.	18.
109.	536.	1082.	1173.	1087.	936.	763.	588.	433.	356.
305.	253.	205.	165.	132.	106.	86.	69.	55.	44.
34.	25.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	19.	19.	19.	19.	19.	19.	19.	19.

STORAGE

6.	6.	6.	6.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	5.	6.	7.	8.	8.	8.
9.	9.	9.	9.	9.	8.	8.	8.	8.	8.
8.	8.	8.	8.	9.	9.	9.	10.	10.	10.
11.	11.	12.	14.	15.	17.	19.	22.	24.	26.
29.	31.	34.	38.	45.	55.	70.	89.	111.	138.
172.	204.	221.	224.	221.	216.	211.	205.	200.	196.
191.	186.	181.	177.	174.	171.	169.	168.	166.	165.
164.	164.	163.	162.	162.	161.	160.	160.	159.	158.
157.	157.	156.	155.	154.	154.	153.	152.	151.	151.

STAGE

1138.0	1138.0	1138.0	1138.0	1137.9	1137.9	1137.9	1137.9	1137.9	1137.9
1137.8	1137.8	1137.8	1137.8	1137.8	1137.8	1137.7	1137.7	1137.7	1137.7
1137.7	1137.7	1137.7	1137.6	1137.6	1137.6	1137.6	1137.6	1137.6	1137.6
1137.6	1137.6	1137.6	1137.7	1137.9	1138.1	1138.2	1138.3	1138.4	1138.4
1138.5	1138.5	1138.5	1138.5	1138.5	1138.4	1138.4	1138.4	1138.4	1138.4
1138.4	1138.4	1138.4	1138.4	1138.5	1138.5	1138.6	1138.6	1138.7	1138.7
1138.8	1138.9	1139.0	1139.2	1139.4	1139.6	1139.9	1140.1	1140.4	1140.6
1140.8	1141.1	1141.4	1141.7	1142.3	1143.2	1144.3	1145.6	1147.0	1148.6
1150.3	1151.9	1152.7	1152.9	1152.7	1152.5	1152.3	1152.0	1151.8	1151.5
1151.3	1151.0	1150.8	1150.6	1150.4	1150.3	1150.2	1150.1	1150.1	1150.0
1150.0	1149.9	1149.9	1149.9	1149.8	1149.8	1149.8	1149.7	1149.7	1149.6
1149.6	1149.6	1149.5	1149.5	1149.4	1149.4	1149.4	1149.3	1149.3	1149.2

PEAK OUTFLOW IS 1173. AT TIME 42.00 HOURS

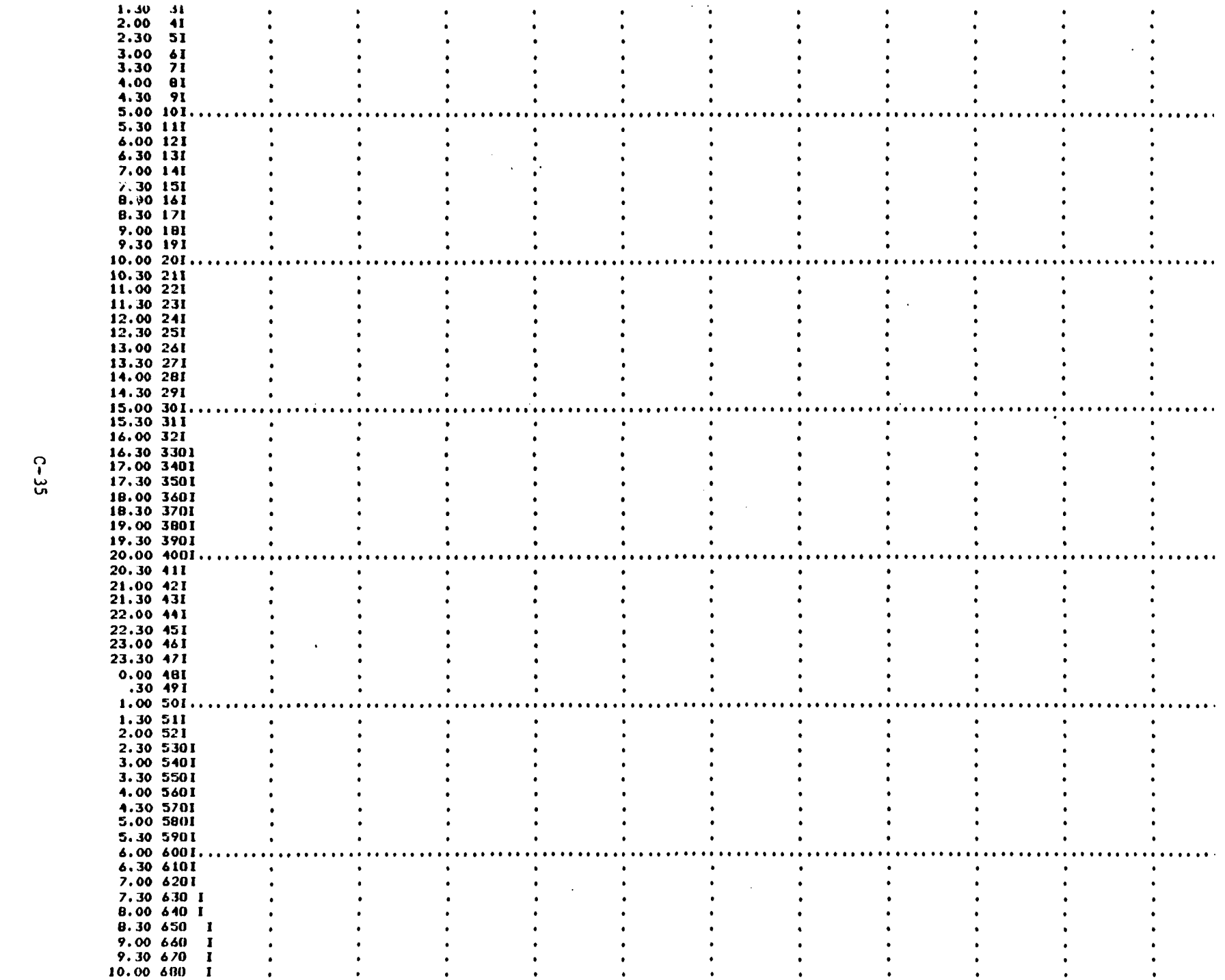
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1173.	639.	188.	78.	9317.
CMS	33.	18.	5.	2.	264.
INCHES		9.44	11.08	11.46	11.46
MM		239.70	281.32	291.18	291.18
AC-FT		317.	372.	385.	385.
THOUS CU M		391.	459.	475.	475.

1*OVF*

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

		0.	200.	400.	600.	800.	1000.	1200.	1400.	0.	0.	0.	0.
.30	11	.	.	.	.	.	.	.	.	.	.	.	.
1.00	21	.	.	.	.	.	.	.	.	.	.	.	.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2.00 41
2.30 51
3.00 61
3.30 71
4.00 81
4.30 91
5.00 101
5.30 111
6.00 121
6.30 131
7.00 141
7.30 151
8.00 161
8.30 171
9.00 181
9.30 191
10.00 201
10.30 211
11.00 221
11.30 231
12.00 241
12.30 251
13.00 261
13.30 271
14.00 281
14.30 291
15.00 301
15.30 311
16.00 321
16.30 3301
17.00 3401
17.30 3501
18.00 3601
18.30 3701
19.00 3801
19.30 3901
20.00 4001
20.30 411
21.00 421
21.30 431
22.00 441
22.30 451
23.00 461
23.30 471
0.00 481
.30 491
1.00 501
1.30 511
2.00 521
2.30 5301
3.00 5401
3.30 5501
4.00 5601
4.30 5701
5.00 5801
5.30 5901
6.00 6001
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8.30 650 I
9.00 660 I
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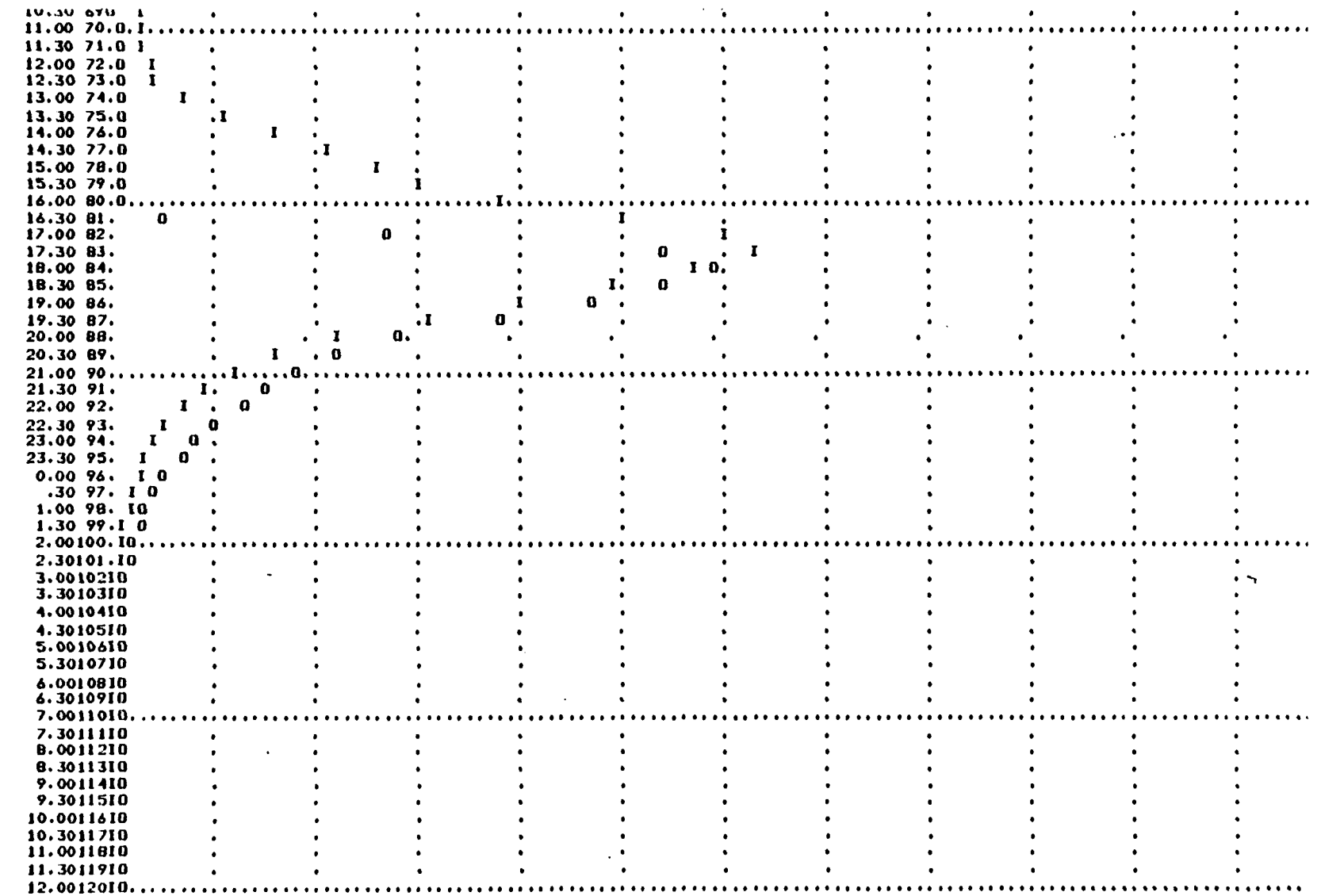
10.00 680 I



1*OVN*

STATION 1, PLAN 1, RATIO 7

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	4.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	3.	3.	3.	4.	5.	5.	5.	5.

5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	6.	6.	6.	6.	6.	6.
7.	7.	7.	8.	9.	9.	10.	10.	10.	11.
11.	11.	11.	12.	13.	14.	15.	16.	18.	20.
360.	1052.	1348.	1387.	1273.	1094.	892.	687.	506.	379.
332.	279.	229.	186.	150.	121.	98.	79.	64.	51.
39.	29.	22.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	19.	19.	19.	19.	19.	19.	19.

STORAGE

6.	6.	6.	6.	6.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	5.	6.	7.	8.	9.	9.	10.
10.	10.	10.	10.	10.	10.	9.	9.	9.	9.
9.	9.	9.	10.	10.	10.	11.	11.	12.	12.
13.	13.	14.	16.	18.	20.	22.	25.	28.	31.
34.	37.	40.	45.	53.	65.	82.	104.	130.	162.
196.	220.	229.	231.	227.	221.	215.	208.	203.	198.
193.	188.	183.	179.	176.	173.	171.	169.	167.	166.
165.	164.	163.	163.	162.	161.	161.	160.	159.	159.
158.	157.	156.	156.	155.	154.	153.	153.	152.	151.

STAGE

1138.0	1138.0	1138.0	1138.0	1138.0	1137.9	1137.9	1137.9	1137.9	1137.9
1137.8	1137.8	1137.8	1137.8	1137.8	1137.8	1137.8	1137.7	1137.7	1137.7
1137.7	1137.7	1137.7	1137.7	1137.7	1137.6	1137.6	1137.6	1137.6	1137.6
1137.6	1137.6	1137.7	1137.8	1138.0	1138.2	1138.3	1138.5	1138.5	1138.6
1138.6	1138.6	1138.6	1138.6	1138.6	1138.6	1138.6	1138.6	1138.5	1138.5
1138.5	1138.5	1138.6	1138.6	1138.7	1138.7	1138.8	1138.8	1138.9	1139.0
1139.0	1139.1	1139.3	1139.4	1139.7	1139.9	1140.2	1140.5	1140.8	1141.1
1141.3	1141.6	1141.9	1142.3	1143.0	1143.9	1145.1	1146.5	1148.1	1149.8
1151.6	1152.7	1153.1	1153.2	1153.0	1152.8	1152.5	1152.1	1151.9	1151.7
1151.4	1151.2	1150.9	1150.7	1150.5	1150.4	1150.3	1150.2	1150.1	1150.0
1150.0	1149.9	1149.9	1149.9	1149.8	1149.8	1149.8	1149.7	1149.7	1149.7
1149.6	1149.6	1149.5	1149.5	1149.5	1149.4	1149.4	1149.3	1149.3	1149.3

PEAK OUTFLOW IS 1387. AT TIME 42.00 HOURS

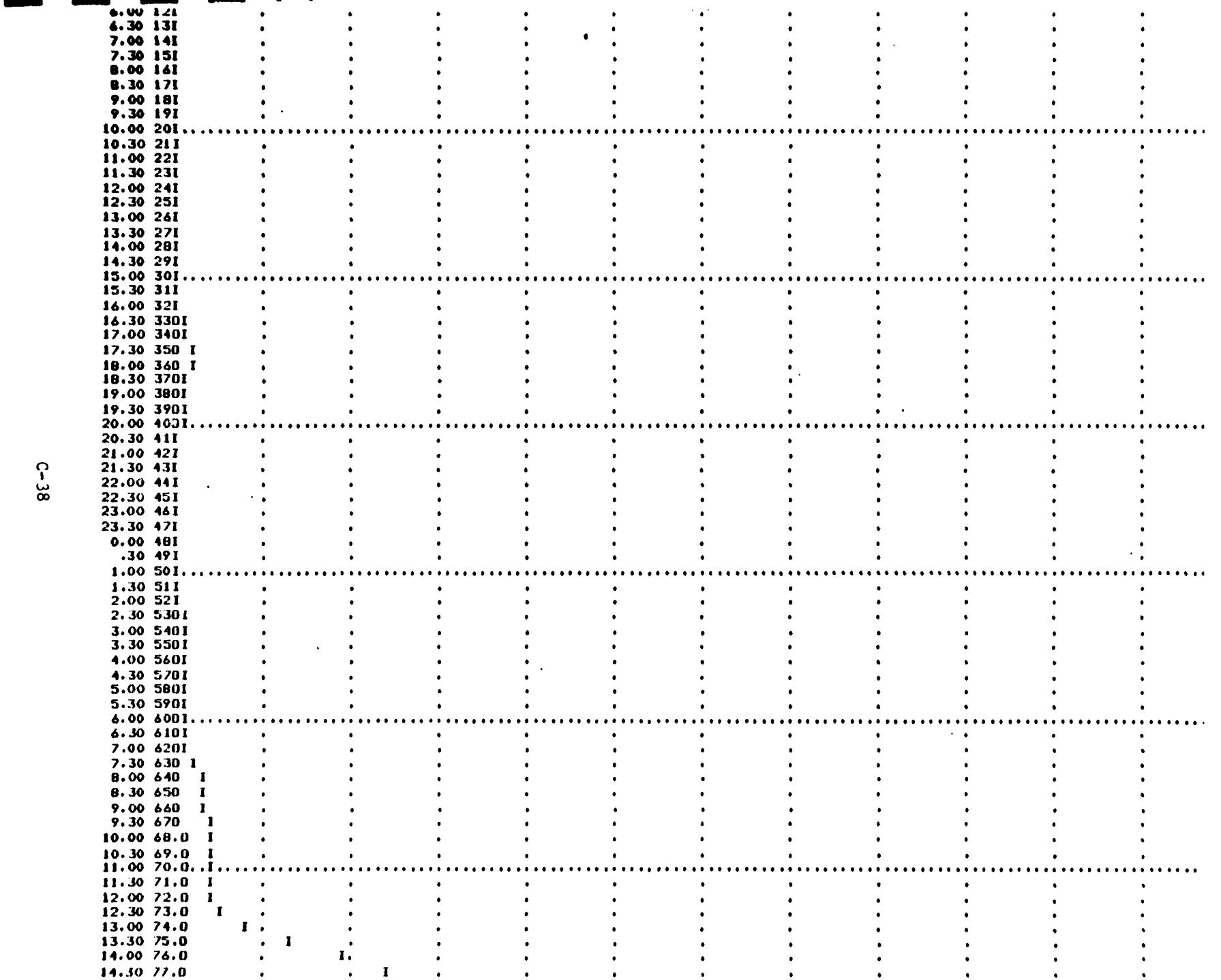
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1387.	793.	231.	95.	11442.
CMS	39.	22.	7.	3.	324.
INCHES		11.72	13.66	14.08	14.08
MM		297.59	347.02	357.60	357.60
AC-FT		393.	459.	473.	473.
THOUS CU M		485.	566.	583.	583.

1*OVF*

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

		0.	200.	400.	600.	800.	1000.	1200.	1400.	1600.	0.	0.	0.
.30	1I	.	.	.	.	.	.	.	.	.	.	.	.
1.00	2I	.	.	.	.	.	.	.	.	.	.	.	.
1.30	3I	.	.	.	.	.	.	.	.	.	.	.	.
2.00	4I	.	.	.	.	.	.	.	.	.	.	.	.
2.30	5I	.	.	.	.	.	.	.	.	.	.	.	.
3.00	6I	.	.	.	.	.	.	.	.	.	.	.	.
3.30	7I	.	.	.	.	.	.	.	.	.	.	.	.
4.00	8I	.	.	.	.	.	.	.	.	.	.	.	.
4.30	9I	.	.	.	.	.	.	.	.	.	.	.	.
5.00	10I	.	.	.	.	.	.	.	.	.	.	.	.
5.30	11I	.	.	.	.	.	.	.	.	.	.	.	.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7.00 14I
7.30 15I
8.00 16I
8.30 17I
9.00 18I
9.30 19I
10.00 20I
10.30 21I
11.00 22I
11.30 23I
12.00 24I
12.30 25I
13.00 26I
13.30 27I
14.00 28I
14.30 29I
15.00 30I
15.30 31I
16.00 32I
16.30 330I
17.00 340I
17.30 350 I
18.00 360 I
18.30 370I
19.00 380I
19.30 390I
20.00 400I
20.30 41I
21.00 42I
21.30 43I
22.00 44I
22.30 45I
23.00 46I
23.30 47I
0.00 48I
.30 49I
1.00 50I
1.30 51I
2.00 52I
2.30 530I
3.00 540I
3.30 550I
4.00 560I
4.30 570I
5.00 580I
5.30 590I
6.00 600I
6.30 610I
7.00 620I
7.30 630 I
8.00 640 I
8.30 650 I
9.00 660 I
9.30 670 I
10.00 68.0 I
10.30 69.0 I
11.00 70.0 I
11.30 71.0 I
12.00 72.0 I
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13.00 74.0 I
13.30 75.0 I
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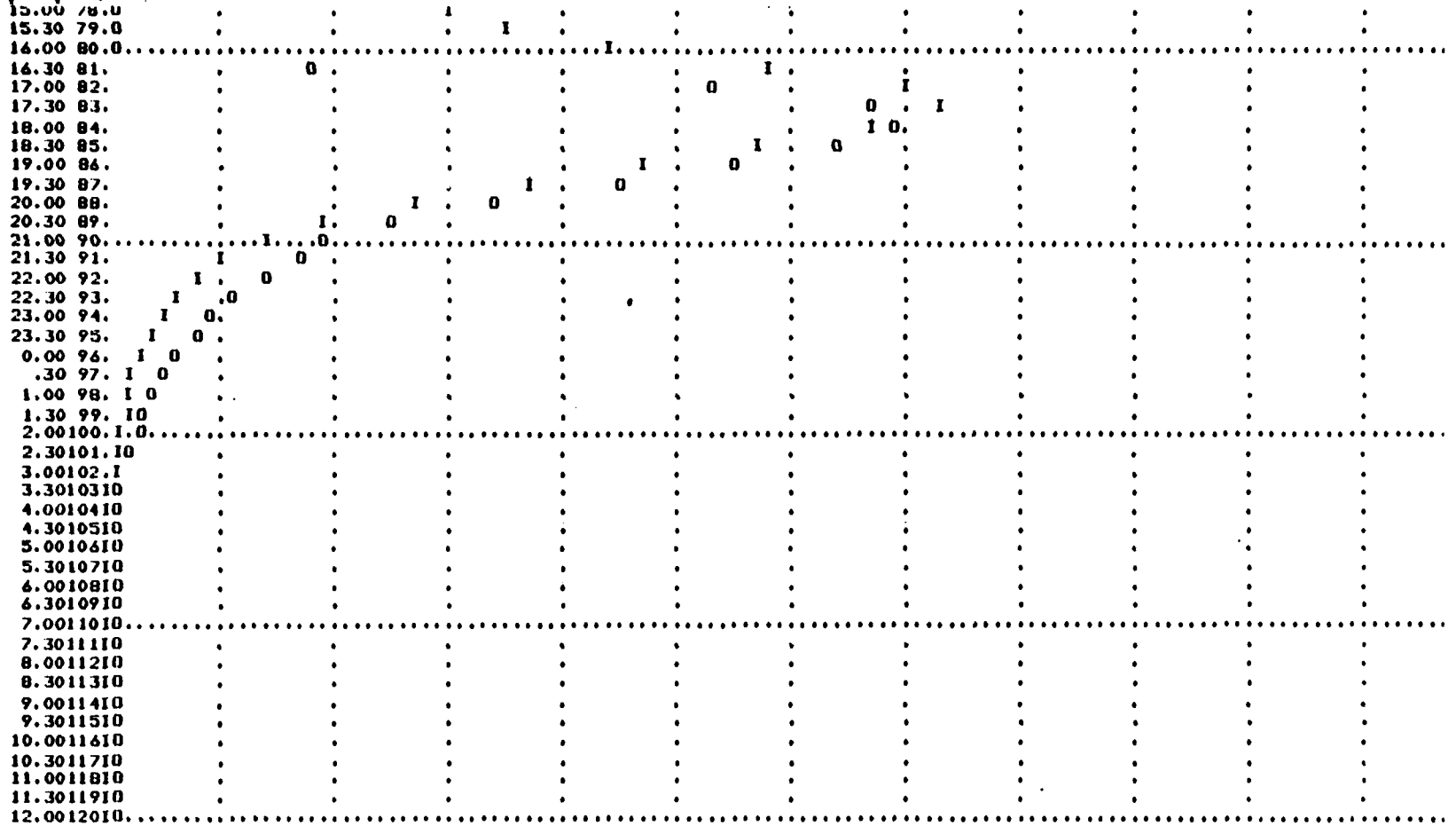
14.30 77.0 I



180VN#

STATION 1, PLAN 1, RATIO 8

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	4.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	2.	2.
2.	2.	3.	3.	4.	4.	5.	5.	6.	6.
6.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	6.	6.	7.	7.	7.
7.	8.	8.	9.	9.	10.	10.	10.	11.	11.
11.	12.	12.	13.	13.	14.	16.	17.	19.	214.
743.	1308.	1561.	1590.	1456.	1251.	1020.	786.	579.	419.
353.	302.	251.	205.	167.	136.	111.	90.	72.	57.
44.	33.	25.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	19.	19.	19.	19.	19.	19.

STORAGE

6.	6.	6.	6.	6.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	5.	6.	7.	9.	9.	10.	11.
11.	11.	11.	11.	11.	11.	11.	10.	10.	10.
10.	10.	11.	11.	11.	12.	12.	13.	13.	14.
14.	15.	16.	18.	20.	23.	26.	29.	32.	35.
39.	42.	46.	51.	61.	75.	95.	120.	149.	182.
210.	228.	236.	237.	233.	226.	219.	211.	205.	200.
195.	190.	185.	181.	177.	174.	172.	170.	168.	167.
165.	164.	164.	163.	162.	162.	161.	160.	160.	159.
158.	157.	157.	156.	155.	154.	154.	153.	152.	152.

STAGE

1138.0	1138.0	1138.0	1138.0	1138.0	1137.9	1137.9	1137.9	1137.9	1137.9
1137.9	1137.8	1137.8	1137.8	1137.8	1137.8	1137.8	1137.8	1137.7	1137.7
1137.7	1137.7	1137.7	1137.7	1137.7	1137.7	1137.7	1137.6	1137.6	1137.6
1137.6	1137.6	1137.7	1137.8	1138.1	1138.3	1138.4	1138.6	1138.7	1138.8
1138.8	1138.8	1138.8	1138.8	1138.8	1138.8	1138.8	1138.7	1138.7	1138.7
1138.7	1138.7	1138.7	1138.8	1138.9	1138.9	1139.0	1139.1	1139.1	1139.2
1139.3	1139.4	1139.5	1139.7	1140.0	1140.2	1140.5	1140.9	1141.2	1141.5
1141.8	1142.1	1142.4	1142.9	1143.6	1144.6	1145.9	1147.5	1149.2	1150.9
1152.2	1153.1	1153.5	1153.5	1153.3	1153.0	1152.6	1152.3	1152.0	1151.7
1151.5	1151.3	1151.0	1150.8	1150.6	1150.5	1150.3	1150.2	1150.2	1150.1
1150.0	1150.0	1149.9	1149.9	1149.9	1149.8	1149.8	1149.8	1149.7	1149.7
1149.6	1149.6	1149.6	1149.5	1149.5	1149.4	1149.4	1149.4	1149.3	1149.3

PEAK OUTFLOW IS 1590. AT TIME 42.00 HOURS

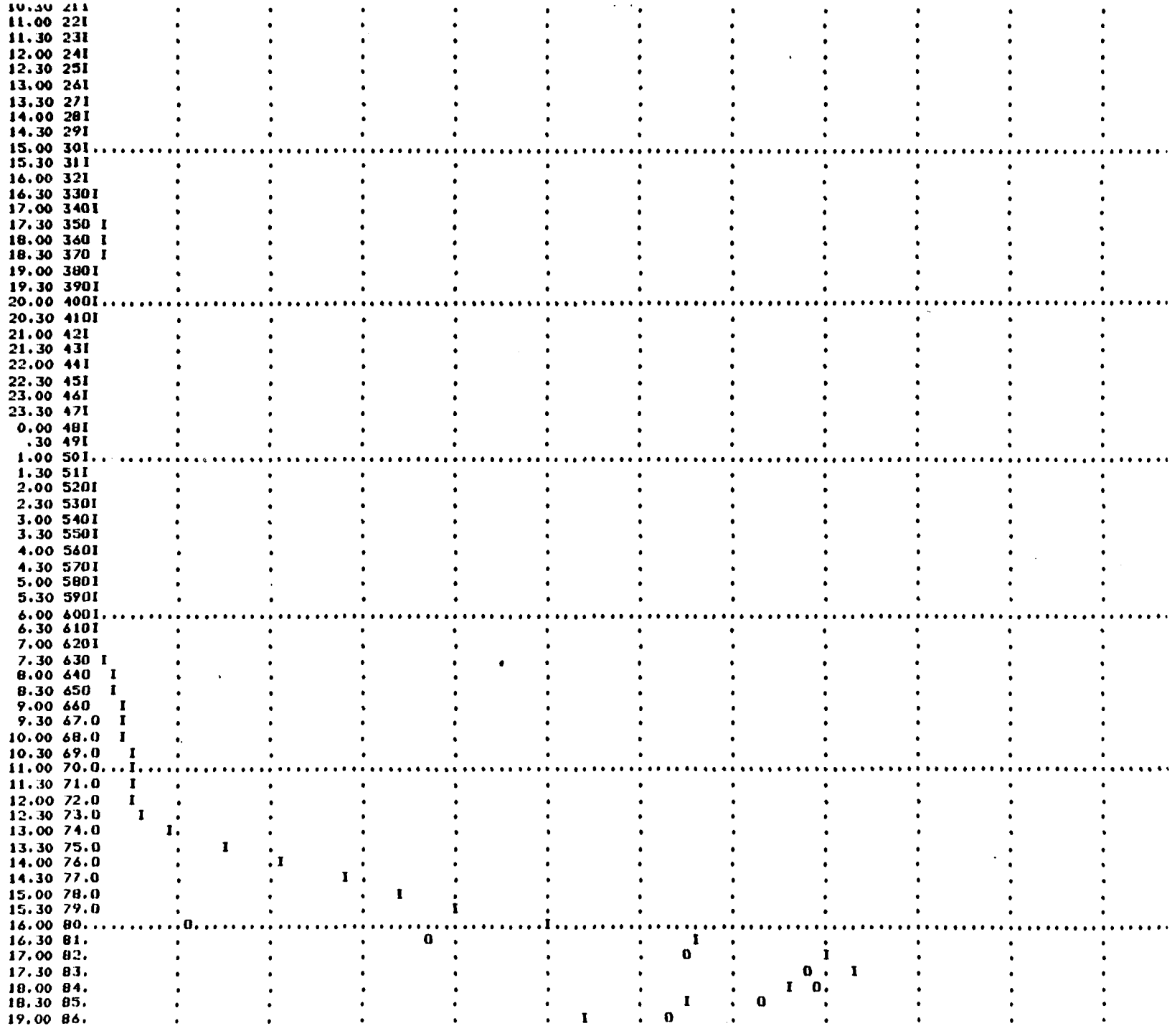
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1590.	944.	275.	113.	13568.
CMS	45.	27.	8.	3.	384.
INCHES		13.93	16.25	16.69	16.69
MM		353.94	412.81	424.04	424.04
AC-FT		468.	546.	561.	561.
THOUS CU M		577.	673.	692.	692.

1*OVF*

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

	0.	200.	400.	600.	800.	1000.	1200.	1400.	1600.	1800.	0.	0.
.30	1I	.	.	.	.	.	.	.	.	.	.	.
1.00	2I	.	.	.	.	.	.	.	.	.	.	.
1.30	3I	.	.	.	.	.	.	.	.	.	.	.
2.00	4I	.	.	.	.	.	.	.	.	.	.	.
2.30	5I	.	.	.	.	.	.	.	.	.	.	.
3.00	6I	.	.	.	.	.	.	.	.	.	.	.
3.30	7I	.	.	.	.	.	.	.	.	.	.	.
4.00	8I	.	.	.	.	.	.	.	.	.	.	.
4.30	9I	.	.	.	.	.	.	.	.	.	.	.
5.00	10I	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5.30	11I	.	.	.	.	.	.	.	.	.	.	.
6.00	12I	.	.	.	.	.	.	.	.	.	.	.
6.30	13I	.	.	.	.	.	.	.	.	.	.	.
7.00	14I	.	.	.	.	.	.	.	.	.	.	.
7.30	15I	.	.	.	.	.	.	.	.	.	.	.
8.00	16I	.	.	.	.	.	.	.	.	.	.	.
8.30	17I	.	.	.	.	.	.	.	.	.	.	.
9.00	18I	.	.	.	.	.	.	.	.	.	.	.
9.30	19I	.	.	.	.	.	.	.	.	.	.	.
10.00	20I	.....	.....	.....	.....	.....	.....					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15.00 30I
15.30 31I
16.00 32I
16.30 33OI
17.00 34OI
17.30 350 I
18.00 360 I
18.30 370 I
19.00 38OI
19.30 39OI
20.00 40OI
20.30 41OI
21.00 42I
21.30 43I
22.00 44I
22.30 45I
23.00 46I
23.30 47I
0.00 48I
.30 49I
1.00 50I
1.30 51I
2.00 52OI
2.30 53OI
3.00 54OI
3.30 55OI
4.00 56OI
4.30 57OI
5.00 58OI
5.30 59OI
6.00 60OI
6.30 61OI
7.00 62OI
7.30 630 I
8.00 640 I
8.30 650 I
9.00 660 I
9.30 67.0 I
10.00 68.0 I
10.30 69.0 I
11.00 70.0 I
11.30 71.0 I
12.00 72.0 I
12.30 73.0 I
13.00 74.0 I
13.30 75.0 I
14.00 76.0 I
14.30 77.0 I
15.00 78.0 I
15.30 79.0 I
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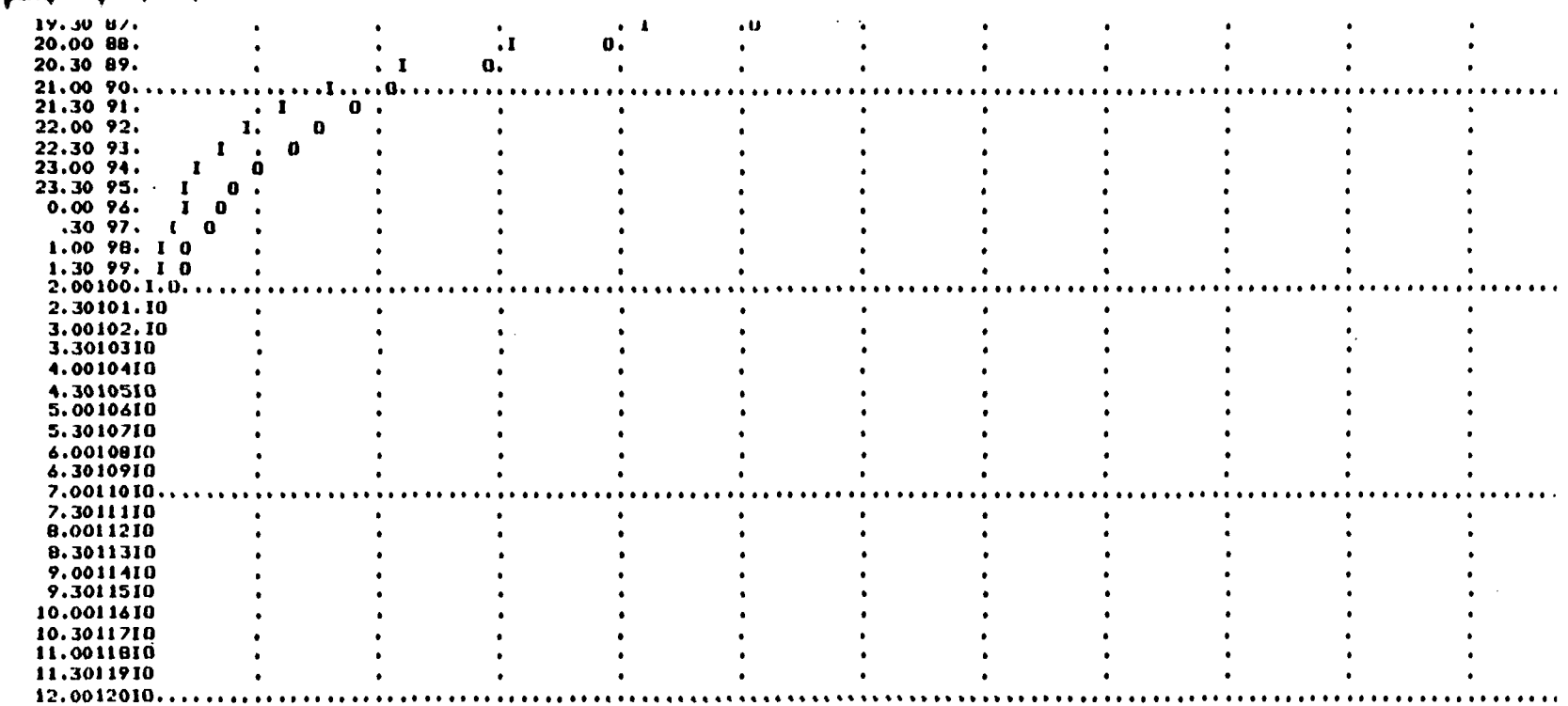
19.00 86. I 0



1*OVN*

STATION 1, PLAN 1, RATIO 9

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	4.	4.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	4.	5.	6.	6.	6.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	8.	8.	8.	8.
9.	9.	9.	10.	10.	10.	11.	11.	12.	12.
12.	13.	13.	14.	14.	16.	17.	19.	234.	742.
1301.	1708.	1965.	1990.	1823.	1567.	1279.	985.	726.	525.
386.	341.	291.	242.	199.	164.	134.	110.	89.	71.
55.	41.	31.	23.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	19.	19.	19.	19.	19.	19.

STORAGE

6.	6.	6.	6.	6.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	5.	6.	7.	9.	10.	11.	12.	13.
13.	13.	13.	13.	13.	13.	13.	13.	13.	12.
12.	13.	13.	13.	14.	15.	15.	16.	16.	17.
18.	19.	20.	22.	25.	29.	32.	36.	41.	45.
49.	53.	58.	65.	77.	95.	119.	151.	184.	210.

228.	241.	250.	250.	245.	236.	227.	218.	209.	203.
199.	194.	189.	184.	180.	177.	174.	172.	170.	168.
166.	165.	164.	163.	163.	162.	162.	161.	160.	159.
159.	158.	157.	157.	156.	155.	154.	154.	153.	152.

STAGE

1138.0	1138.0	1138.0	1138.0	1138.0	1137.9	1137.9	1137.9	1137.9	1137.9
1137.9	1137.9	1137.8	1137.8	1137.8	1137.8	1137.8	1137.8	1137.8	1137.8
1137.8	1137.7	1137.7	1137.7	1137.7	1137.7	1137.7	1137.7	1137.7	1137.7
1137.7	1137.7	1137.8	1138.0	1138.2	1138.5	1138.7	1138.9	1139.0	1139.1
1139.1	1139.1	1139.1	1139.1	1139.1	1139.1	1139.1	1139.1	1139.0	1139.0
1139.0	1139.0	1139.1	1139.1	1139.2	1139.3	1139.4	1139.5	1139.5	1139.6
1139.7	1139.8	1140.0	1140.2	1140.5	1140.8	1141.2	1141.6	1141.9	1142.3
1142.7	1143.0	1143.4	1143.9	1144.7	1145.9	1147.5	1149.2	1150.9	1152.2
1153.1	1153.7	1154.1	1154.1	1153.8	1153.5	1153.0	1152.6	1152.2	1151.9
1151.7	1151.5	1151.2	1151.0	1150.8	1150.6	1150.5	1150.3	1150.2	1150.1
1150.1	1150.0	1150.0	1149.9	1149.9	1149.9	1149.8	1149.8	1149.7	1149.7
1149.7	1149.6	1149.6	1149.6	1149.5	1149.5	1149.4	1149.4	1149.4	1149.3

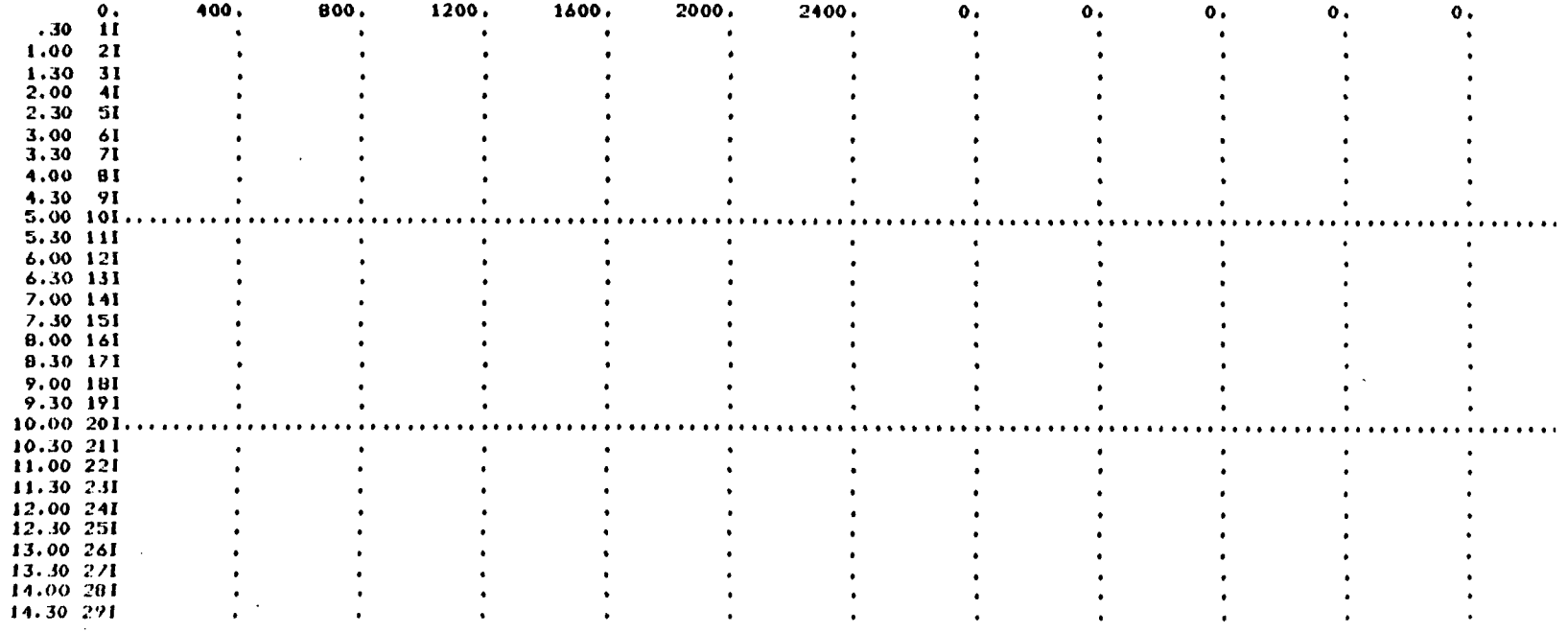
PEAK OUTFLOW IS 1990. AT TIME 42.00 HOURS

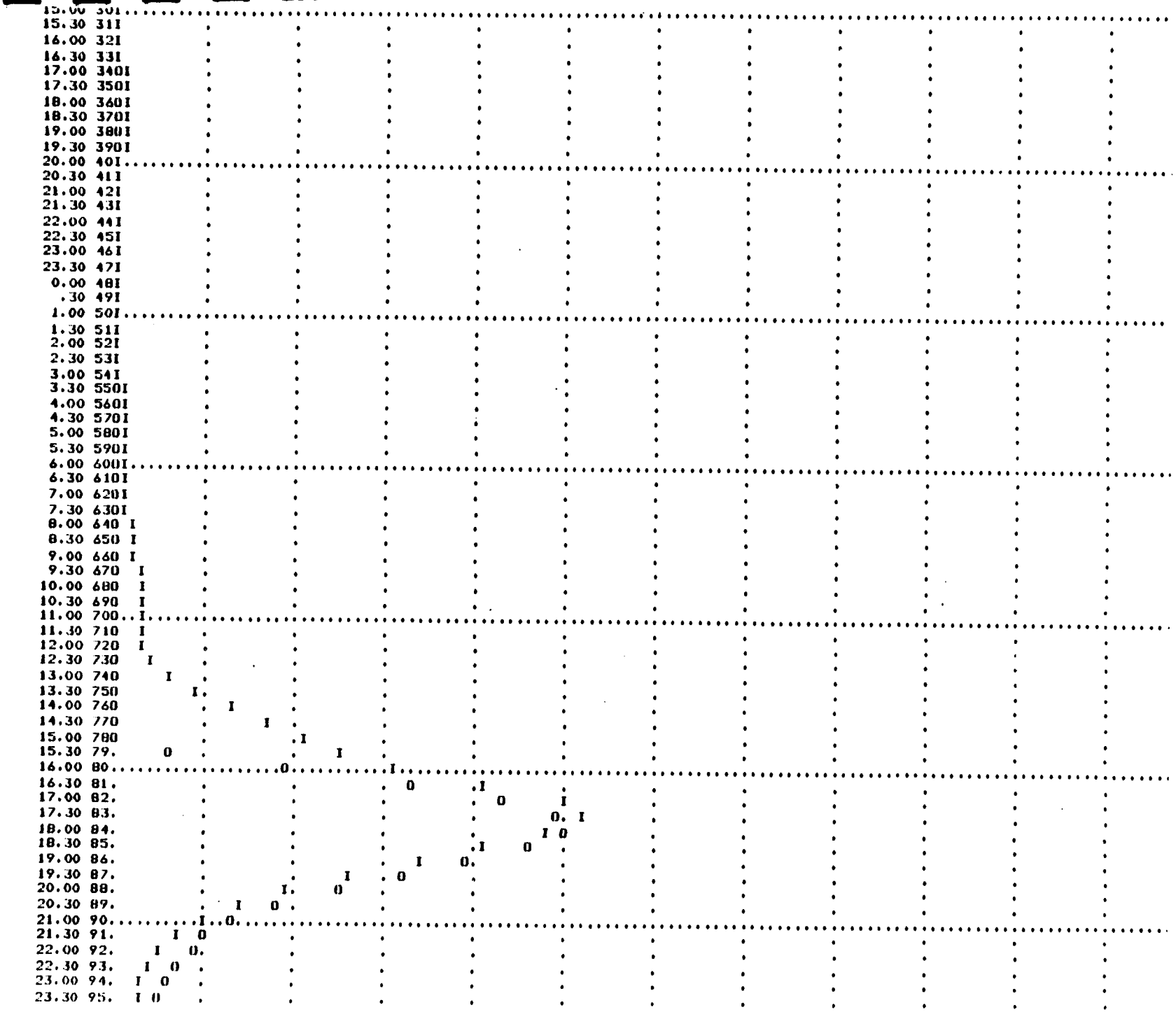
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1990.	1243.	363.	149.	17823.
CMS	56.	35.	10.	4.	505.
INCHES		18.36	21.44	21.93	21.93
MM		466.32	544.61	557.05	557.05
AC-FT		617.	720.	737.	737.
THOUS CU M		760.	888.	908.	908.

#DVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

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16.00 321
16.30 331
17.00 3401
17.30 3501
18.00 3601
18.30 3701
19.00 3801
19.30 3901
20.00 401
20.30 411
21.00 421
21.30 431
22.00 441
22.30 451
23.00 461
23.30 471
0.00 481
.30 491
1.00 501
1.30 511
2.00 521
2.30 531
3.00 541
3.30 5501
4.00 5601
4.30 5701
5.00 5801
5.30 5901
6.00 6001
6.30 6101
7.00 6201
7.30 6301
8.00 640
8.30 650
9.00 660
9.30 670
10.00 680
10.30 690
11.00 700
11.30 710
12.00 720
12.30 730
13.00 740
13.30 750
14.00 760
14.30 770
15.00 780
15.30 79.
16.00 80
16.30 81.
17.00 82.
17.30 83.
18.00 84.
18.30 85.
19.00 86.
19.30 87.
20.00 88.
20.30 89.
21.00 90.
21.30 91.
22.00 92.
22.30 93.
23.00 94.
23.30 95.

```
 0.00 96. 1 0
  .30 97. IO
 1.00 98.1 0
 1.30 99.10
 2.00100.10.....................................................................
 2.30101.I
 3.0010210
 3.3010310
 4.0010410
 4.30105I
 5.00106I
 5.30107I
 6.00108I
 6.30109I
 7.00110I.....................................................................
 7.30111I
 8.00112I
 8.30113I
 9.00114I
 9.30115I
10.00116I
10.30117I
11.00118I
11.30119I
12.00120I.....................................................................

1*OVN*

1          **********      **********      **********      **********      **********
```


PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .10	RATIO 2 .20	RATIO 3 .30	RATIO 4 .40	RATIO 5 .50	RATIO 6 .60	RATIO 7 .70	RATIO 8 .80	RATIO 9 1.0
HYDROGRAPH AT	1	.63	1	209.	417.	626.	835.	1043.	1252.	1461.	1669.	208(
	(	1.63)	(	5.91)(	11.82)(	17.72)(	23.63)(	29.54)(	35.45)(	41.36)(	47.27)(	59.08)
ROUTED TO	1	.63	1	14.	20.	286.	613.	910.	1173.	1387.	1590.	199(
	(	1.63)	(	.41)(	.55)(	8.09)(	17.36)(	25.76)(	33.22)(	39.27)(	45.01)(	56.34)

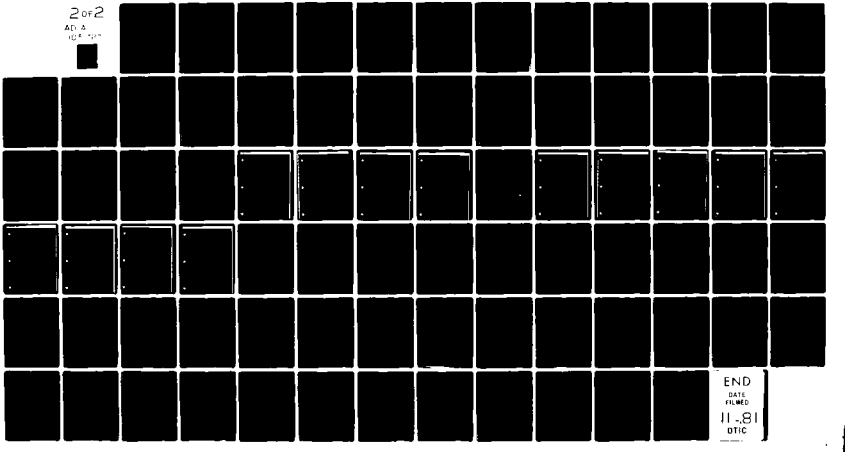
1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1138.05	1149.90	1156.60
STORAGE	6.	163.	309.
OUTFLOW	4.	20.	3660.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	1144.67	0.00	76.	14.	0.00	47.00	0.00

AD-A105 727 FLAHERTY-GIAVARA ASSOCIATES NEW HAVEN CT F/G 13/13
NATIONAL DAM SAFETY PROGRAM. LITTLE CHOCONUT WATERSHED SITE 2A --ETC(U)
JUN 81 H C FLAHERTY DACW51-81-C-0006
UNCLASSIFIED NL



.20	1149.57	0.00	157.	20.	0.00	48.00	0.00
.30	1151.20	0.00	189.	286.	0.00	43.50	0.00
.40	1152.04	0.00	206.	613.	0.00	42.50	0.00
.50	1152.48	0.00	215.	910.	0.00	42.00	0.00
.60	1152.88	0.00	224.	1173.	0.00	42.00	0.00
.70	1153.20	0.00	231.	1387.	0.00	42.00	0.00
.80	1153.50	0.00	237.	1590.	0.00	42.00	0.00
1.00	1154.10	0.00	250.	1990.	0.00	42.00	0.00

1**********

FLOOD HYDROGRAPH PACKAGE (HEC-1)

DAM SAFETY VERSION JULY 1978

LAST MODIFICATION 26 FEB 79

APPENDIX D

PREVIOUS INSPECTION REPORTS/AVAILABLE DOCUMENTS

DESIGN REPORT

LITTLE CHOCONUT, FINCH HOLLOW,
AND
TROUT BROOK WATERSHED PROTECTION PROJECT

DESIGN REPORT

SITE 2A

BROOME COUNTY, NEW YORK

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

November 1966

DESIGN SECTION, SYRACUSE, N.Y.

U S DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE

This floodwater retarding structure is located on Little Choconut Creek approximately 0.15 miles northwest of Choconut Center, New York. Sheet 4 of this report, together with the Castle Creek, N.Y. 7.5' quadrangle published by the U. S. Geological Survey, may be used to locate this structure.

A summary of pertinent design information is given on Sheet 2 of this report.

Criteria and procedures used in this design are given in Soil Conservation Service publications.

This is one of eight proposed floodwater retarding dams in the Little Choconut, Finch Hollow, and Trout Brook Watershed designed to reduce floodwater damages. It will retard a 100-year frequency storm without discharge occurring in the emergency spillway.

The results of hydrologic and hydraulic computations are given on Sheet 3 of this report.

The structure consists of a homogeneous compacted earth fill of glacial till with a cutoff trench into a foundation primarily of glacial till and glacial lacustrine material overlying bedrock. A drainage system is located under the downstream portion of the earth fill to control the phreatic surface and provide a safe outlet for foundation seepage.

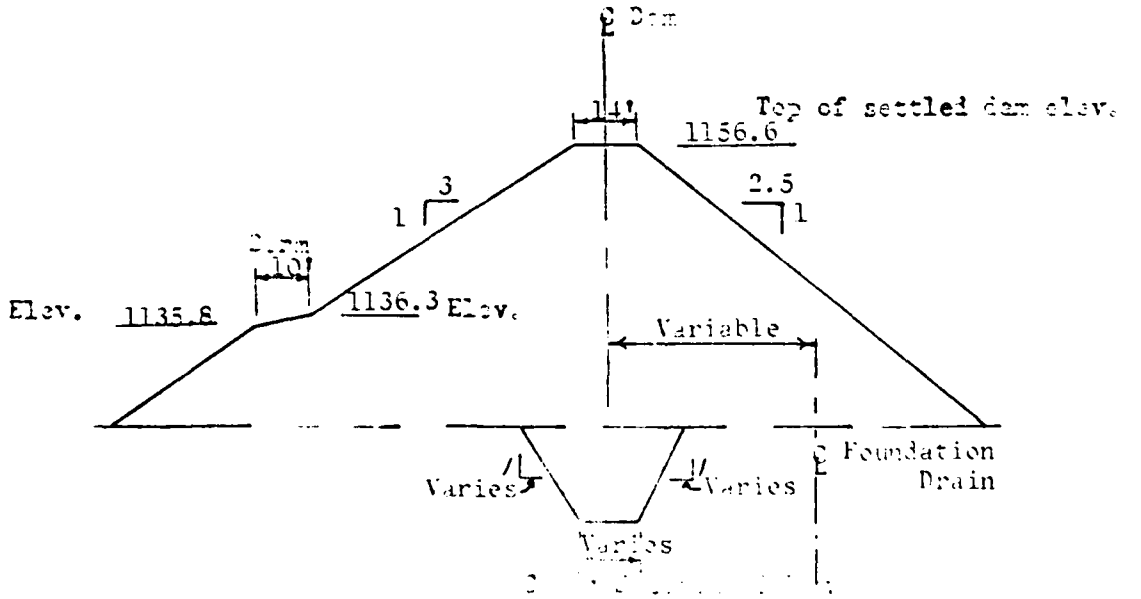
The principal spillway is a drop inlet structure consisting of a single stage reinforced concrete riser, a 24 inch diameter reinforced concrete water pipe, and a channel excavated into bedrock at the outlet end of the conduit.

The emergency spillway is designed as an earth cut with vegetation in the left abutment.

U S DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE

DESIGN REPORT SUMMARY

I.	Watershed data	
	A. Structure class	C
	B. Drainage area	406 ac.
	C. Time of concentration - T_c	0.50 hrs.
	D. Hydrologic curve number - C_n Moisture Condition II	83
II.	Principal spillway	
	A. Conduit	
	1. Size (I.D.)	24 In.
	2. Length	164.33 Ft.
	B. Riser	
	1. Size	2.5x2.5 Ft.
	2. Height (floor to orifice crest)	6.4 Ft.
	C. Orifice size	1.17x1.0 Ft.
	D. Reservoir drain size	6 In.
	E. Type of energy dissipator	Bedrock channel
III.	Emergency spillway	
	A. Width	80.0 Ft.
	B. Side slopes	3:1
	C. Length of level section	30 Ft.
	D. Exit slope	0.033 Ft./Ft.
	E. Maximum velocity - in exit section (ESH)	5.0 Ft./Sec.
	F. Duration of flow (ESH) through emergency spillway	0.34 Hrs.
	G. Frequency of use	100 yrs.
IV.	Earth fill	
	A. Height	27 Ft.
	B. Volume	80,000 C.Y.
	C. Compaction	Class A



U.S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

Element of Structure	Determining Factor	Elevation	Surface Area Acres	Storage		Inflow		Peak Outflow
				Acre-Feet	Inches *	Volume Inches	Rate (c.f.s.)	(c.f.s.)
Crest of Orifice	50 year submerged sediment accumulation	1136.8	4.0	8 1/	0.24			
Crest of emergency spillway	100 yr. frequency storm Moisture Condition II	1149.9	19.2	155 2/	4.58			20
Design high water	1.00 x value from ** ES 1020 Sheet 4 of 5 Moisture Condition II	1151.7	20.6	192 2/	5.67	7.22	1,804	388
Top of Dam	1.00 x value from ** ES 1020 Sheet 5 of 5 Moisture Condition II	1156.6	24.3	302 2/	8.93	21.60	5,653	3,660

*Volume expressed in inches of runoff from controlled area of 406 acres.

** Hydrologic criteria in National Engineering Memorandum SCS-27(Rev.).

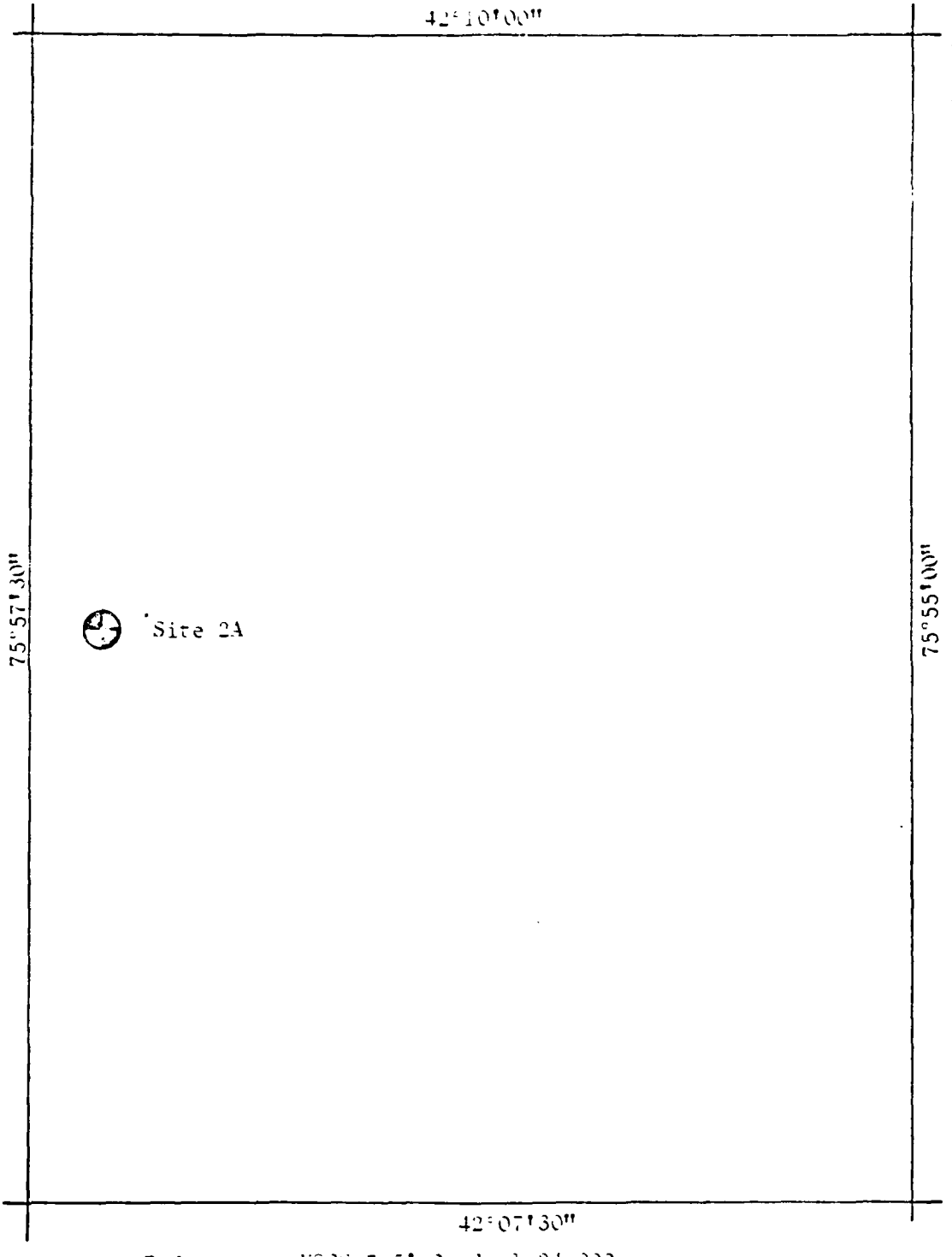
Time required to empty temporary storage = 83 percent of storage drawdown in 10 days.

1/Storage allocated to sediment pool.

2/Does not include 19 ac.ft. of sediment.

DESIGN SECTION, SYRACUSE, NY

U S DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE



Reference: USGS 7.5' Quad. 1:24,000

CASTLE CREEK, NEW YORK

U S DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE

Information pertaining to the criteria and procedures referred to in this report may be obtained from Mr. Wallace L. Anderson, State Conservation Engr., USDA, Soil Conservation Service, Syracuse, N.Y.

Design Engineer

State Conservation Engineer

DESIGN SECTION, SYRACUSE, N. Y.

SLOPE STABILITY ANALYSIS

U.S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

SUMMARY - SLOPE STABILITY ANALYSIS

PROJECT AND STATE

METHOD OF ANALYSIS

ANALYZED BY

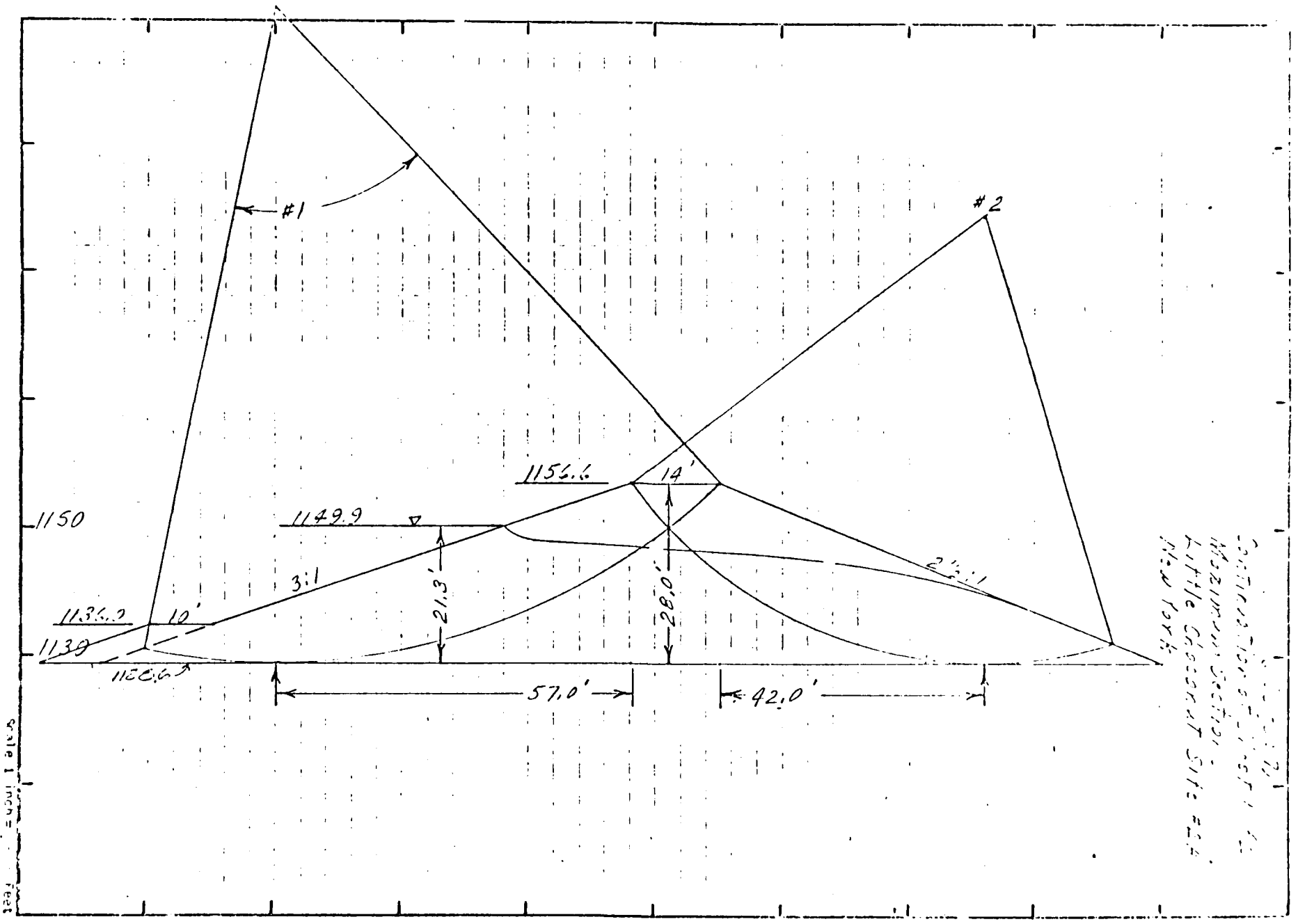
APPROVED BY

DATE

SOURCE AND USE OF MATERIALS	CLASSIFICATION	ADOPTED DESIGN DATA							REMARKS
		γ_d (pcf)	γ_m (pcf)	γ_{sat} (pcf)	γ_{sub} (pcf)	ϕ (deg)	ton ϕ	c (psf)	
① Hole 51-A Found.	CL	97.5		122.5		27.0°	0.510	250	
② Emer. Spwy. Emb. &	GC	126.0	136.5	142.5	79.0	19.2°	0.324	750	
③									
④									
⑤									
⑥									
⑦									
⑧									

TRIAL NO.		SLOPE	CONDITIONS	F_s
			Maximum Section	
Up	1	3:1	Full drawdown - Noberm - Arc cut from upp. shlr. thru Emb. only at Mat'l. ①	1.6
Dn	2	2½:1	Rodzin - Noberm - Arc cut from upp. shlr. thru Emb. only at Mat'l. ②	2.5

Sheet 2 of 2


#1
#2
1156.6
14'
1150
1149.9
3:1
2:1
21.3'
28.0'
1136.2
10'
1130
57.0'
42.0'
Scale 1 inch = Feet

GEOLOGY REPORT

GEOLOGY REPORT

SITE 2-A

LITTLE CHOCONUT WATERSHED

UNION TOWNSHIP

NEW YORK

APPROVAL:

W. S. Atkinson
State Conservation Engineer

PREPARED BY:

B. S. Ellis
Bernard S. Ellis
Geologist

REFERENCE:	U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE D-8	DRAWING NO. NY-2016-G SHEET 1 OF ___ DATE 2/66

Form SCS-376A
Sheet 1 of ___

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

10-59

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

GENERAL

State New York County Broome S ___ T ___ N, Sec ___ R ___ W, Watershed L Choconut Creek

Investigated WP-08 Site number 2-A Sheet ___ of ___ Structure C

Investigated by B.S.E. Geologist WP Equipment used Backhoe, Drill Rig Date 10/65

SITE DATA

Drainage area size 0.63 sq. mi. 403 acres Type of structure Earth Fill Purpose Floodwater Retarding

Direction from nearest town Southeast Maximum height of fill 26.6 feet Length 530 feet

Estimated volume of fill required 24,000 cubic yards

STORAGE ALLOCATION

	Volume (acre-feet)	Surface Area (acres)	Depth (feet)
Sediment	19.0	4.0	4.8
Floodwater	155.0	19.2	14.9

SURFACE GEOLOGY AND PHYSIOGRAPHY

Physiographic description Appalachian Plateau Topography Steep Attitude of beds NW-40°/mile Strike S 80° W

Steepness of abutments: left 9 percent, right 23 percent. Width of floodplain at centerline of dam 160 feet

General geology of site: This site is located approximately 2 miles due north of Johnson City, New York. Drainage in this area flows southerly to the Susquehanna River, situated 4 miles SW of the site.

The topography in the area ranges from an elevation of 800' in the Susquehanna River to 1600' on some of the higher hills. Glacial action, while not having a greatly modifying effect on the topography, has had a smoothing tendency. Glacial lacustrine deposits in the valleys have decreased the pre-glacial relief. Scour & ablation of the ridge tops was slight, as the ice sheet was thin in this area. The outer limit of continental glaciation was only about 40 miles south of Binghamton.

The underlying bedrock is Upper Devonian in age and is almost exclusively shales & siltstones of the Catskill Delta. This site is situated on the southeast limb of the Horseheads Syncline. This syncline is one of a series of gently undulating folds that trend west and then southwest across the southern tier of counties in New York State. They are related to the intensely folded belt of the Appalachians and gradually disappear as a series of low, gentle swells to the north.

(2)

SURFACE GEOLOGY (continued)

Historically, the site appears to have experienced some glacial scour of the valley bottom and southwest abutment. Subsequent melt waters deposited silts and clays in the valley bottom. These probably represent a northwesterly extension of a glacial lake formed in the Choconut and Susquehanna valleys. Till, associated with the glacial advance, mantles the rest of the site.

(3)

Form SCS-3768
Sheet ___ of ___

USDA-SCS

10-59

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Centerline of Dam
(Centerline of Dam, Principal Spillway, Emergency Spillway, the Stream Channel, Investigations for Drainage of Structure, Borrow Area, Reservoir Basin, etc.)

DRILLING PROGRAM

Equipment Used	Number of Holes		Number of Samples Taken		
	Exploration	Sampling	Undisturbed (state type)	Disturbed Large	Disturbed Small
Backhoe	4	—	—	—	—
Drill Rig	5	5	2 - Shelby	—	31 (Jar)
			17' of NX Core		
Total	9	5	—	—	31 (Jar)

SUMMARY OF FINDINGS
(include only factual data)

The left abutment of this site is a fairly uniform, dense glacial till down to the vicinity of D.H. 51. At this location, the till is underlain by silts & clays of relatively low density.

In the flood plain, the till is apparently absent in the upper section of the profile. (The present impoundment of water prevented any drilling in a section approximately 160' in length along the C/L.)

In the lower right abutment, the silts and clays are present in the entire profile down to a depth of 20'. Higher up the abutment, bedrock is within 6' or 7' of the surface and is overlain by till. At elevations above the top of dam, the bedrock appears to be at or near the surface.

There were no materials encountered along the C/L that would be considered permeable.

The bedrock in the right abutment is an interbedded siltstone and shale. The upper 2' or so is weathered to a moderate degree. The column in general shows about 80% bedded 1"-3" thick and fairly soft. The remaining 20% is an average of 4"-6" thick and considerably more competent. A set of joints oriented approximately north-south is well developed in this area. An east-west set is less well developed.

The bedrock surface drops off steeply under the flood plain to an unknown depth.

Form SCS 378B
Sheet __ of __

USDA-SCS

10-59

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Principal Spillway

(Centerline of Dam, Principal Spillway, Emergency Spillway, the Stream Channel, Investigations for Drainage of Structure, Borrow Area, Reservoir Basin, etc.)

DRILLING PROGRAM

Equipment Used	Number of Holes		Number of Samples Taken		
	Exploration	Sampling	Undisturbed (state type)	Disturbed Large	Disturbed Small
Backhoe	1	—	—	—	—
Drill Rig	3	3	6' of NX Core	—	8 (Jar)
Total	4	3	—	—	8 (Jar)

SUMMARY OF FINDINGS

(Include only factual data)

Bedrock underlies the C/L of the principal spillway at varying depths. Depending on final location of the pipe, the depth will range from 5.7 ft. to 10.5 ft.

The material overlying the bedrock is approximately 4' of silt (ML) and 4' of clay (CL) at the location of T.P. 301. Downstream toward the C/L of dam and the outlet structure, these materials grade into a mixture of alluvial and lacustrine deposits.

(5)

Form SCS 378
Sheet __ of __

USDA-SCS

10-59

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Emergency Spillway
(Centerline of Dam, Principal Spillway, Emergency Spillway, the Stream Channel, Investigations for Drainage of Structure, Borrow Area, Reservoir Basin, etc.)

DRILLING PROGRAM

Equipment Used	Number of Holes		Number of Samples Taken		
	Exploration	Sampling	Undisturbed (state type)	Disturbed Large	Disturbed Small
Backhoe	4	1	—	1	—
Total	4	1	—	1	—

SUMMARY OF FINDINGS
(include only factual data)

The emergency spillway excavation will be entirely in a fairly uniform glacial till. Bedrock was not encountered in any of the test pits, some of which were carried to 3' below design grade.

Several sandy streaks were noted in this till, and a minor amount of seepage was present in these sands.

Form SCS-376B
Sheet ___ of ___

USDA-SCS

10-59

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Borrow Area

(Centerline of Dam, Principal Spillway, Emergency Spillway, the Stream Channel, Investigations for Drainage of Structure, Borrow Area, Reservoir Basin, etc.)

DRILLING PROGRAM

Equipment Used	Number of Holes		Number of Samples Taken		
	Exploration	Sampling	Undisturbed (state type)	Disturbed Large	Disturbed Small
Backhoe	5	2	—	2	—
Total	5	2	—	2	—

SUMMARY OF FINDINGS

(Include only factual data)

A supplemental borrow area was investigated on the left abutment. This area extends from approximately 200' to 600' upstream from the C/L extension on the left side of the dam, and is contiguous with the emergency spillway.

Most of the borrow area is underlain by glacial till to a depth of 8' or 9'. The same sandy streaks discussed under "Emergency Spillway" exist in this area.

The lower corner of the area, in the vicinity of T.P. 102, is till overlain by a mottled brown and gray silt.

It is estimated that there are in excess of 12,000 cu. yds. of suitable fill material available from this borrow area.

(7)

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

FEATURE Miscellaneous
(Centerline of Dam, Principal Spillway, Emergency Spillway, Pre-Stream Channel, Investigations for Drainage of Structure, Borrow Area, Reservoir Basin, etc.)

DRILLING PROGRAM

Equipment Used	Total No. of Holes Completed	Number of Samples Taken: Undisturbed (State type)	Disturbed: Large	Disturbed: Small
Total				

SUMMARY OF FINDINGS
(Include only factual data)

Drain Line

Inaccessibility prohibited an extensive investigation of the drain line. One hole (D.H. 54) was drilled at the approximate location of the drain.

Water Supply

This stream has a rather low base flow, largely due to the small drainage area with open fields. It will probably be necessary, depending on the time of year of course, to provide for a steady supply of water with an upstream sump and auxiliary dam.

Other Materials

There is no suitable riprap material available on this site.

Natural drainage materials are also absent or occur in locations that do not make them readily available.

SOILS CORRELATION TABLE
AND
ESTIMATED AVAILABLE BORROW QUANTITIES

Watershed L.Choconut Creek Site No. 2-A State N.Y. Prepared By B. S. Ellis Date 2/66

Sample	
51.9 51.16 51.21*	These samples were taken to provide data on the silts and clays logged in the floodplain. They represent the range in properties that exist in these materials.
54.6*	This sample was taken to provide lateral correlation of the silts logged in the floodplain.
103.1 104.1	These samples are representative of the till logged in the supplemental borrow area. They represent 12,000 cu. yds. of material.
203.1	This sample is representative of the till logged in the emergency spillway and should be comparable to the borrow area material.

* Processed in SCS State lab, Syracuse, New York

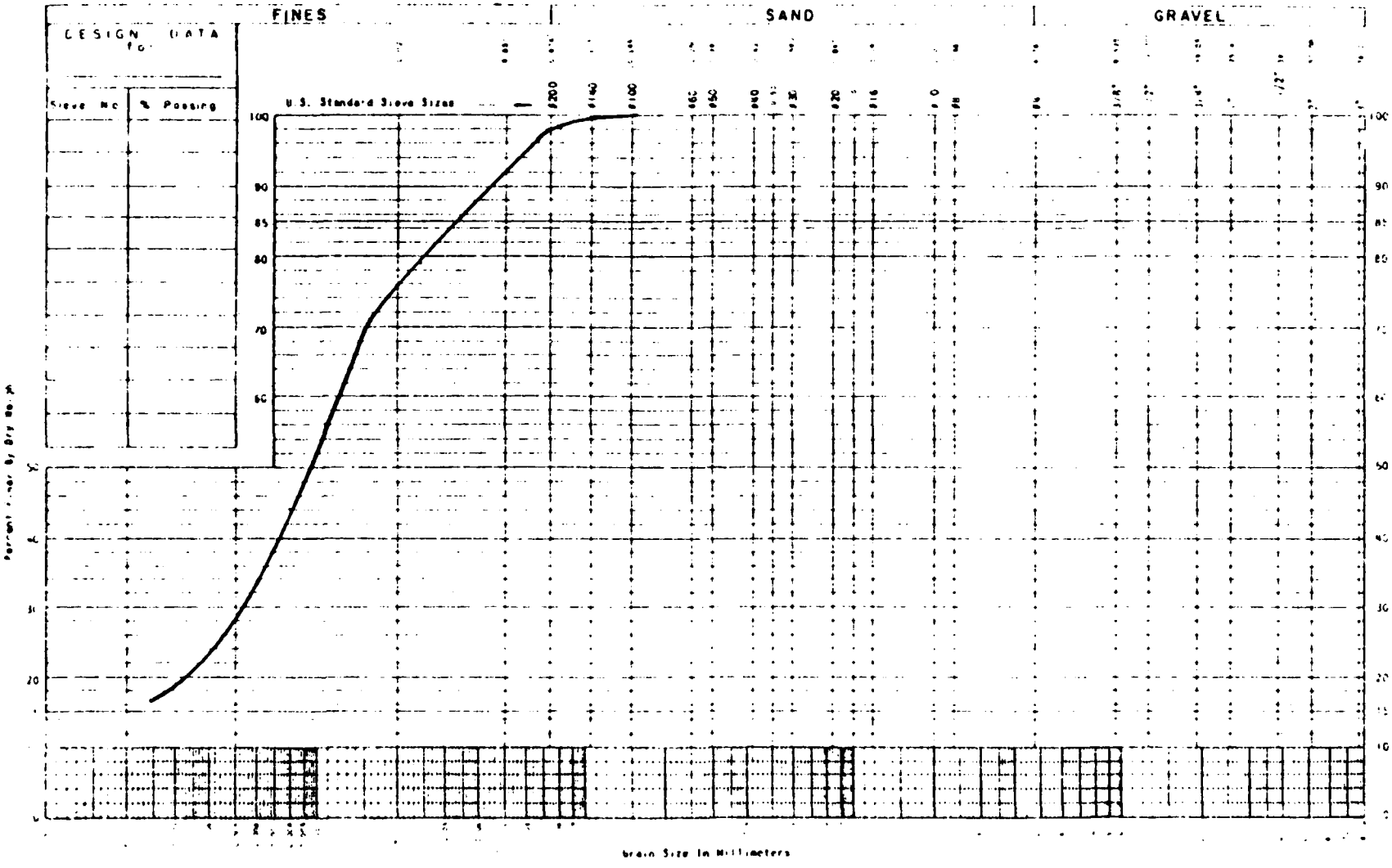
(9)

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

HOLE 51, SAMPLE 9 (12'-13.5')

GRAIN SIZE DISTRIBUTION GRAPH

Project LITTLE CHOCONUT SITE 2-A Location BROOME CO.



ML LL-26, PI-3

GPO 921843

(10)

Form SCS- 1536

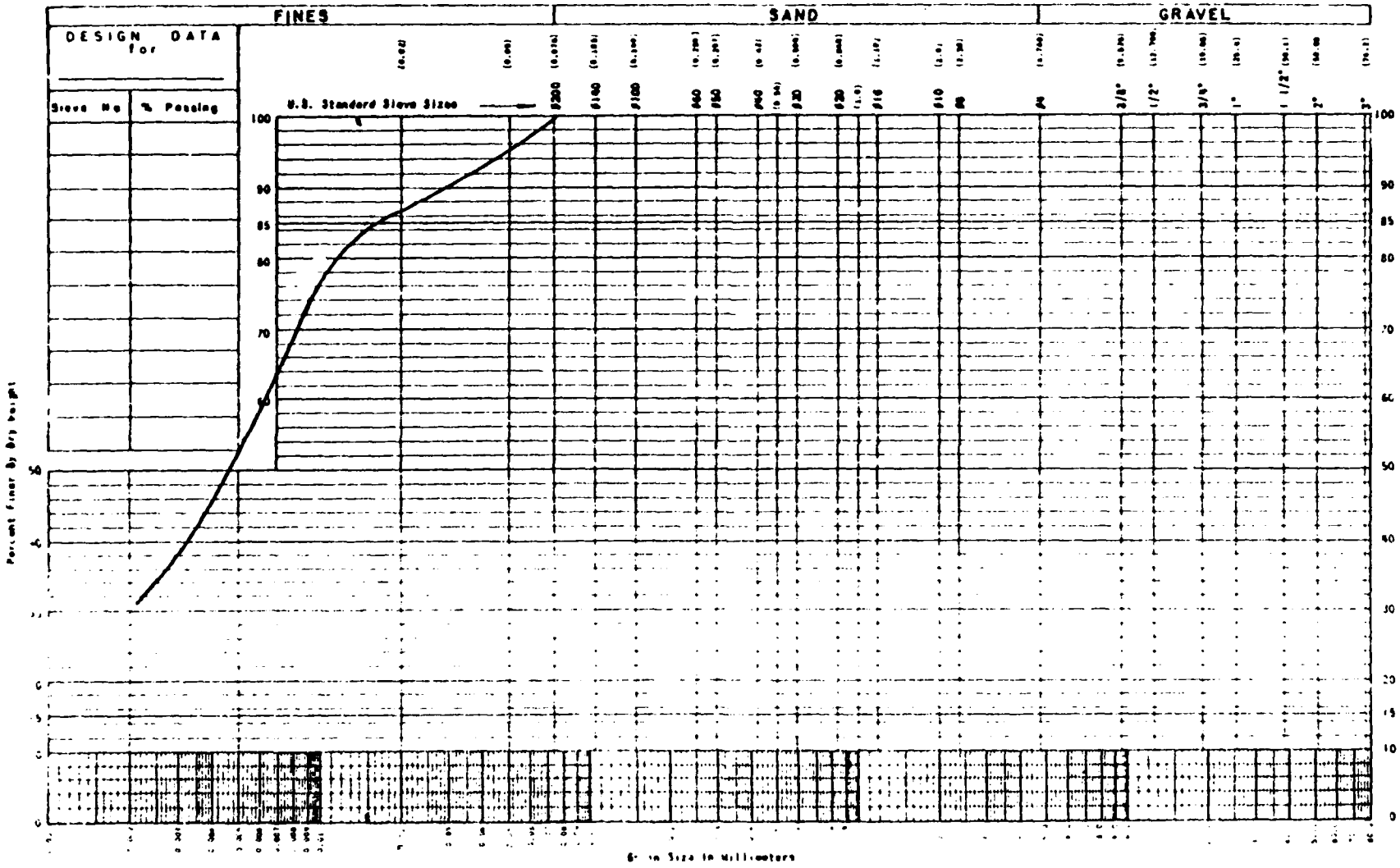
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

HOLE 51, SAMPLE 16 (23'-24.5')

GRAIN SIZE DISTRIBUTION GRAPH

Project LITTLE CHOCONUT SITE 2-A

Location BROOME CO.



CL-ML LL-29, PI-7

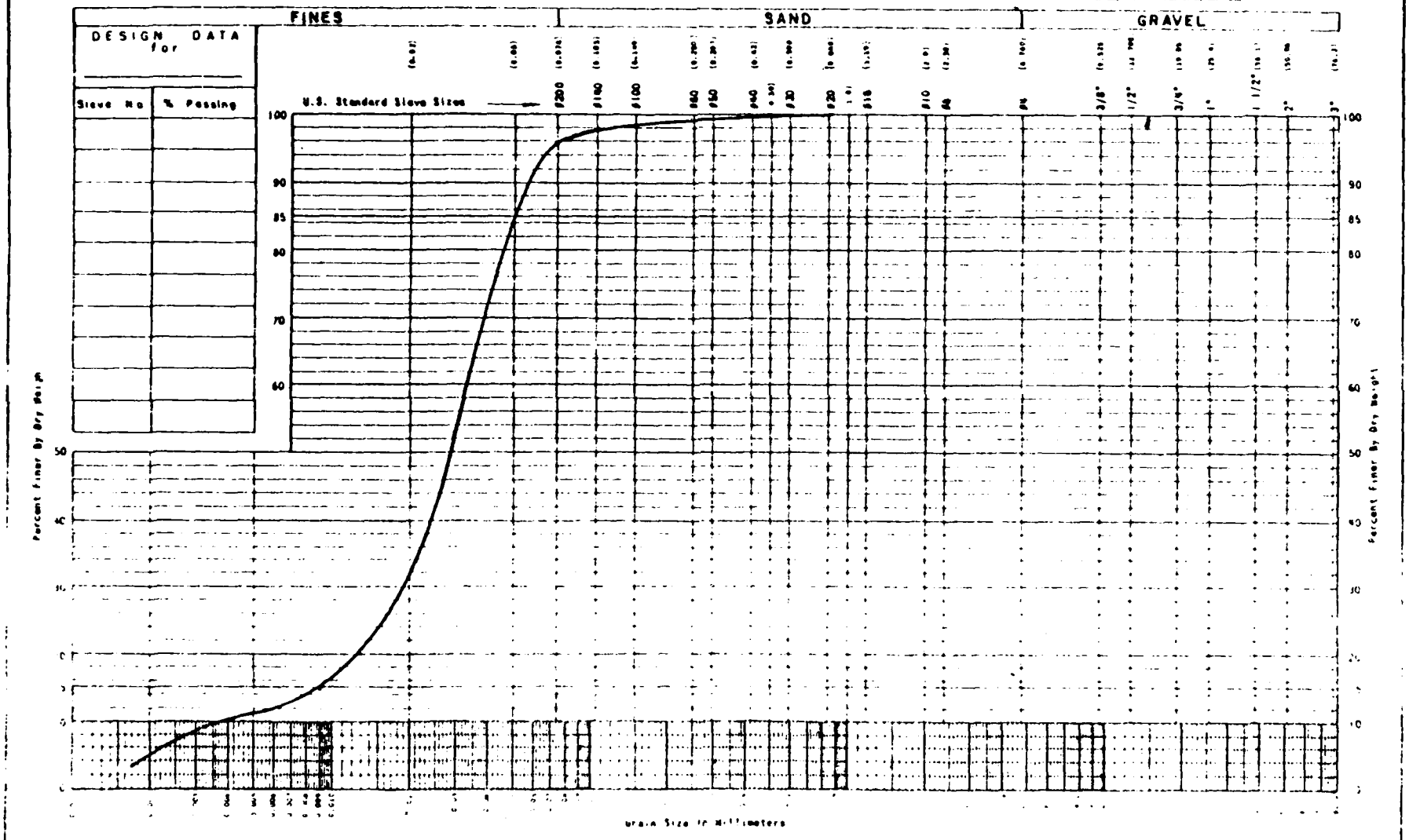
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

HOLE 51, SAMPLE 21 (39'-40.5')

GRAIN SIZE DISTRIBUTION GRAPH

Project LITTLE CHOCONUT SITE 2-A

Location BROOME CO.



ML NO LIMITS RUN

(12)

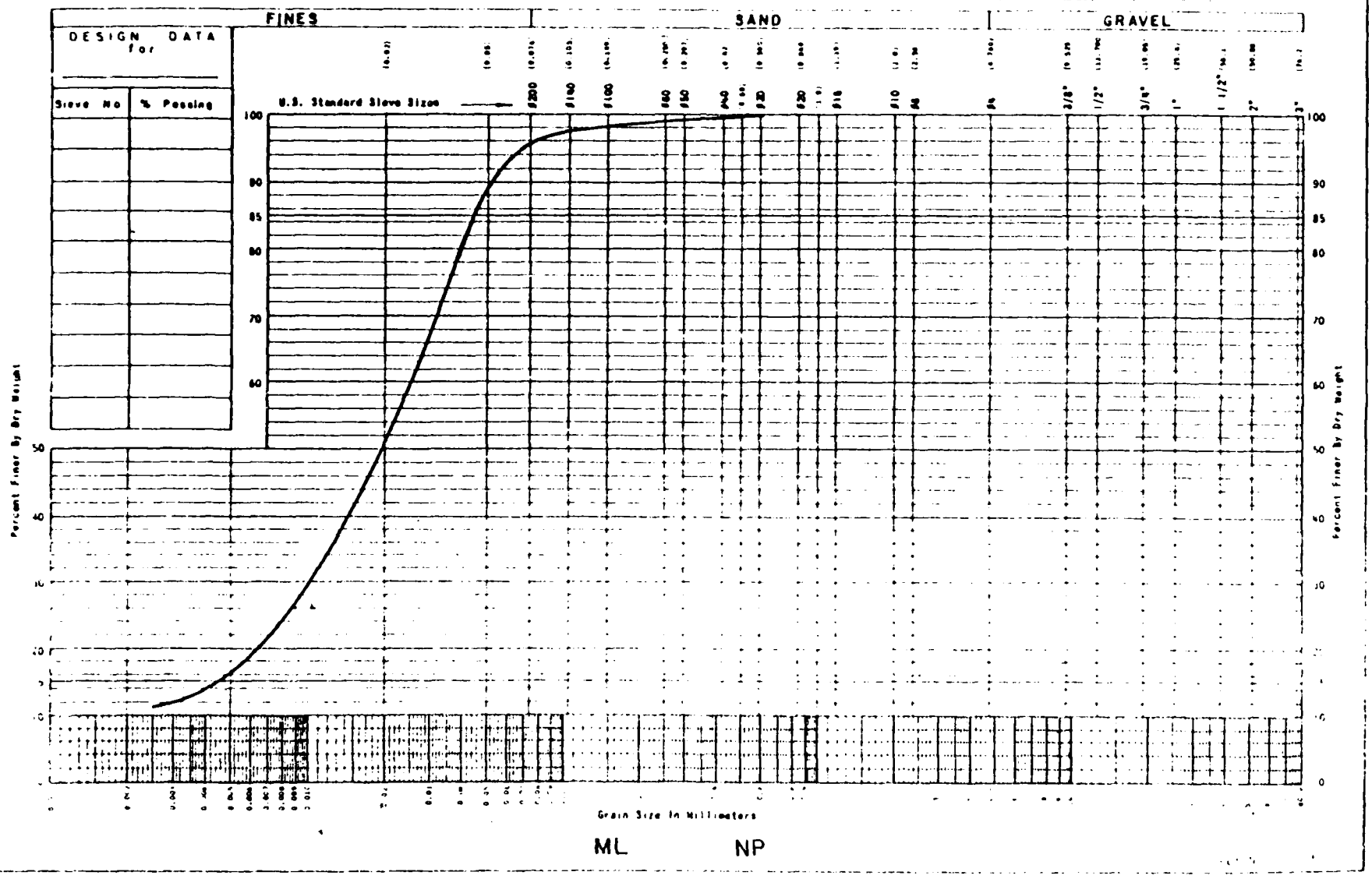
Form SCS-353a

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

HOLE 54, SAMPLE 6 (30'-31.5')

GRAIN SIZE DISTRIBUTION GRAPH

Project LITTLE CHOCONUT SITE 2-A Location BROOME CO.



ML NP

GPO 921843

Form SCS-376C
Sheet ___ of ___
For IA Service Use Only

USDA-SCS

10-69

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

State New York County Broome Watershed L. Choconut Subwatershed _____

Site number 2-A Site group _____ Structure class C Investigated by B.S. Ellis, Geologist Date 10/65
(signature and title)

INTERPRETATIONS AND CONCLUSIONS

Centerline of Dam

The left abutment of this site, from the emergency spillway down to about D.H. #51, should present no problems. The till is dense to very dense and it is uniform. The streaks, or lenses, of sand logged in some areas of this till will present no problems of seepage or piping. Little or no seepage was observed in these pits in this area.

In the floodplain, silts and clays are logged to a depth in excess of 40'. With the exception of a zone from 7' to 12', and below 30', the blow count is pretty much under 20 blows/ft. in this material.

On the right abutment, the silts and clays phase out into glacial till overlying the bedrock.

Consolidation of the silts and clays (and it should be brought out here that the clay logged in this floodplain is actually an ML-CL - see D.H. 51, Sample 16, on page 11 of this report) is, of course, a consideration in the design of this embankment. Because of this, I obtained two Shelby samples that should be representative of the shear strength of this material. It is my feeling that differential settlement will not be a real problem. However, lab tests will either confirm or refute this.

As shown on the plan view, an old earth dam is located just downstream from the C/L of this structure. I recommend that all of this material, as shown on the plan view, be removed. I also suggest that the best thing would be to spoil it downstream from the structure by spreading.

There seems to be little real need for a cutoff through the floodplain section if a good job of scalping is done to get rid of the old fill and any material that may have accumulated in the bottom of the existing pond. A root zone cutoff could be used in the left abutment in the till. In the right abutment, the cutoff should be carried down to fairly unweathered rock. We will not be able to reach a good solid rock at this site. In fact, most of the rock in this entire area is a thin bedded shale and siltstone and is somewhat friable.

In order to establish some sort of a basis for installing a cutoff on this C/L, the following depths at the various T.P. and D.H. locations are suggested:

T.P. 1 - 3'	T.P. 3 - 7'
D.H. 51 - 6'	D.H. 53 - 9'-10'
T.P. 2 - 8'	T.P. 4 - 9'-10'
D.H. 52 - 6'	

Between T.P. 2 and D.H. 52, the cutoff should probably extend down to the top of the "C" horizon.

A profile along the drain line location is shown on page 18 of this report. The sieve analyses for samples #9 and #16 from D.H. 51 can be used as a basis for design.

(1)

Form SCS-376C
Sheet ___ of ___
For In-Service Use Only

USDA-SCS

10-69

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

State New York County Broome Watershed L. Choconut Subwatershed

Site number 2-A Site group ___ Structure class C Investigated by ___ (signature and title) Geologist Date 10/65

INTERPRETATIONS AND CONCLUSIONS (continued)

Principal Spillway

The location of the principal spillway appears to be a little bit critical on this site.

In order to get a foundation on either abutment, the riser will have to be located above a ground elevation of 1136. This will require the excavation of a channel into the abutment to provide pond drainage, if required.

The most feasible location appears to be in the area delineated by a line through TP 301 and D.H. 352. The bedrock surface is fairly uniform along the extent of the pipe, as shown on the principal spillway profile. Excavation depth will be a fairly uniform 10' at this location. Moving the pipe about 20' laterally up the abutment would result in a trench depth of 6'-7'.

The top foot or so of the bedrock is weathered quite badly. This should, of course, be removed.

Emergency Spillway

The emergency spillway excavation is a moderately uniform glacial till.

There is approximately 5% +6" material in this till. It consists of fairly tough flaggy cobbles that will probably not break down with normal compaction equipment.

As indicated earlier, streaks or lenses of sandier material occur in this till. They are carrying water, but I suspect that they are discontinuous in nature. As such, they may bleed for a while on the outside cut of the spillway, but should dry up. In any event, I don't believe they are well defined enough to warrant designing drainage for the outside edge of the spillway. In the event some of them discharge quite regularly, it shouldn't be too much of a job to correct the situation.

I believe it will be necessary to flare the outer edge of the spillway to blend in with the borrow area. We do not have a great excess of suitable material available on this site. If the spillway is hooked around as shown and the borrow area excavated separately, a lot of material will be unavailable. In addition to this, it would make a lot of sense from a construction standpoint to cut this all down at once. I have shown the proposed layout with a dashed line on the plan view.

Borrow Area

Supplemental borrow is available upstream from the emergency spillway. Excavation of this material was discussed to a certain extent in the spillway narrative.

(2)

Form SCS-376C
Sheet ___ of ___
For In-Service Use Only

USDA-SCS

10-69

DETAILED GEOLOGIC INVESTIGATION OF DAM SITES

State New York County Broome Watershed L. Choconut Subwatershed

Site number 2-A Site group ____ Structure class C Investigated by ____, Geologist Date 10/65
(signature and title)

INTERPRETATIONS AND CONCLUSIONS (Continued)

Borrow Area (Continued)

The till in the SW corner of this area in the vicinity of TP-102 and probably in general below the 1148 contour, is overlain by lacustrine silts. In order to use this, the overlying silts will have to be removed. There is sufficient material available above this area, so I suggest that borrowing operations be confined to the higher elevation.

This borrow material is a uniform GM with approximately 35-40% fines. Some sandy streaks do exist, but they are limited enough so that they can readily be mixed in with the main body of till. As indicated in the Soils Correlation Table, there are in excess of 12,000 cu. yds. available.

(3)

SOILS ANALYSES

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

.W.L. Anderson

TO : W. S. Atkinson, State Conservation Engineer, SCS, Syracuse, New York 13210

DATE: April 20, 1966

FROM : Jay M. Decker, Head, Soil Mechanics Laboratory, SCS, Lincoln, Nebraska 68508

SUBJECT: ENG 22-5, New York WT-08, Little Choconut Creek, Site No. , (Broome County)

ATTACHMENTS

1. Form SCS-354, Soil Mechanics Laboratory Data, 1 sheet.
2. Form SCS-128 & 128A, Consolidation Test Data, 1 Test 2 sheets
3. Form SCS-127, Soil Permeability, 1 sheet.
4. Form SCS-355, Triaxial Shear Test, 2 sheets.
5. Form SCS-352, Compaction and Penetration resistance, 3 sheets.
6. Form SCS-129, Undisturbed Sample Characteristics, 1 sheet.
7. Form SCS-357, Summary - Slope Stability Analysis, 2 sheets.
8. Investigational Plans and Profiles

DISCUSSION

FOUNDATION

A. Classification The foundation materials at this site consist primarily of glacial till and glacial lacustrine material overlying bedrock. There is an existing embankment downstream from the proposed centerline, and there is up to 9' of fill and rubble and some very low density silt at the surface, resulting from this dam.

Shale bedrock occurs at depths of from 5 to 10 feet on the right abutment. The shale was encountered at a depth of 14.5', near base of the right abutment. It was not encountered in any of the other borings on the left side of Drill Hole No. 52. Drill Hole No. 51, at the base of the left abutment, penetrated lacustrine sediments to a depth of 40.5'.

The glacial till is a GC or GM material that contains slightly less than 50% fines. The lacustrine material is a fine-grain CL or ML. The material in the core samples was all finer than the 0.05 mm size. The liquid limits were in the range of 30 and the plasticity indices were less than 10.

B. Density: The till is described as a dense till. The lacustrine sediments represented by the samples submitted have densities in the range of 1.52 g/cc to 1.61 g/cc. This is a relatively dense

for materials with this degree of fineness.

C. Shear Strength: A triaxial shear test was made on Sample 66W2345 to represent the lacustrine material. The natural water content of the core was at theoretical saturation. The core had a variable density, and the failure planes of the test specimens indicate the probability of fissures, consequently, the failure envelope is not tangent to all circles. The consolidated, undrained, strength values of $\phi = 27°$ and c = 850 psf were chosen to represent the strength parameters of the two lower density test specimens. The unconsolidated, undrained strength, indicated by the unconfined compression test, is c = 2100 psf.

D. Consolidation: A consolidation test was made on Sample 66W2345. The lacustrine material is preconsolidated as indicated by both the shear test and the consolidation test. The minimum p_c indicated for a loading range through 16,000 psf is approximately 3000 psf. Based on the unconfined compressive strength of Sample 66W2345, the preconsolidation stress is undoubtedly greater than 3000 psf. Consequently, the consolidation potential is expected to be low. We estimate a consolidation potential of slightly over 1% for the lacustrine silt. The overall consolidation potential in the vicinity of Drill Hole 51 is not expected to exceed 0.4'.

E. Permeability: Permeability measurements were made on the consolidation test specimen. The data indicates that the vertical permeability at sample depth is in the range of 0.01 ft./day.

EMBANKMENT

A. Classification: The borrow material from the emergency spillway and from the borrow area is glacial till, classed as GC and GC-GM. The till contains about 30% gravel. It has a liquid limit in the range of 25 to 30 and a plasticity index of less than 10. From 81% to 86% of the material is finer than the 3/4" size.

B. Compacted Density: Standard Proctor compaction tests were made on the minus #4 fraction of the three borrow samples. The compacted density obtained ranged from 118.5 pcf to 121.5 pcf.

C. Shear Strength: A triaxial shear test was made on Sample 66W2347 to represent the materials submitted. A consolidated, undrained test was made on saturated soil compacted to 95% of standard Proctor density. The shear strength values have been interpreted as $\phi = 19°$, c = 750 psf. These values are suggested for design.

SLOPE STABILITY

The stability of the proposed 3:1 upstream and 2½:1 downstream slope was

checked with a Swedish circle method of analysis. The foundation below approximate elevation 1286 consists of a zone of stiff clay that contains flaggy cobbles scattered throughout the matrix. The preconsolidated lacustrine material, represented by the core samples, directly underlies the stiff clay zone described above. Based on blow count, description, and the test data obtained on the core samples, we assumed that foundation below elevation 1286 was strong enough to limit the failure surfaces to the embankment. A 28' high embankment with a 3:1 upstream slope and a 2 1/2:1 downstream slope was analyzed. The strength values used for the embankment were $\phi = 19°$, c = 750 psf. The factors of safety obtained were greater than 2.5. A summary of the analysis is attached.

SETTLEMENT STRAINS

The consolidation potential of the till and the lacustrine material is very low, therefore, differential settlement should not be a problem, provided that the old dam and the associated low density sediments are removed, as suggested in the geology report.

RECOMMENDATIONS

A. Site Preparation: We concur with the geologist's suggestion to remove the old earth dam that is located just downstream from centerline. Recent sediments, resulting from the existing dam, should also be removed from the embankment area. Normal site preparation should be adequate for the rest of the area.

B. Cutoff: We concur with cutoff trench suggested in the geologic report and shown on the attached Form SCS-35B. The proposed trench will bottom in the shale below the contact zone on the right abutment. In the floodplain and on the left abutment, the trench should bottom below the root zone and the zone affected by surface weathering.

The trench backfill may consist of the glacial till represented by the samples submitted. The backfill should be compacted to a minimum of 95% of standard Proctor density with the control based on the minus #4 fraction. We suggest control on the minus #4 fraction here to assure uniformity.

C. Principal Spillway: The proposed location is on the lower portion of the right abutment. Bedrock occurs at a relatively uniform depth of about 8' to 10' in this area. The bedrock is mantled with lacustrine material, and it appears that the stiff clay that contains flaggy cobbles will occur at grade throughout much of the trench. If the cobble content is high, it may be desirable to overexcavate and backfill the trench with compacted material. In either case, the conduit will be bedded in close proximity to the bedrock. The consolidation potential under the conduit will probably not exceed 2%.

The conduit could possibly be shifted to the right, as indicated in the geologic report, and bedded directly on shale.

D. Drain: A drain is recommended to provide a safe outlet for seepage that bypasses the cutoff trench. We suggest a trench drain with a pipe outlet located at about c/b = 0.6. The drain trench should penetrate the foundation to a minimum depth of 5', and it should extend up the abutments to normal pool elevation.

The lacustrine material is a fine grain soil that does not require a special filter gradation. The till contains approximately 15 % of 0.005 mm size material, and the plasticity index is less than 10. Both of these values indicate a material that is moderately susceptible to piping. Therefore, we recommend that ASTM fine concrete aggregate or a sand of comparable gradation be used in conjunction with a coarse filter, such as ASTM No. 78 road gravel. The fine filter should, of course, be placed adjacent to the till and the embankment material.

E. Embankment Design: The following are recommended:

1. Placement of materials: A homogeneous embankment of glacial till is recommended. The till represented by the samples submitted is quite uniform, and the density may be controlled on either the minus #4 fraction, or on the minus 3/4" fraction. The till should be placed at a minimum of 95% of standard Proctor for either method of control.

2. Slopes: The proposed 3:1 upstream and 2 1/2:1 downstream slopes have acceptable factors of safety and are recommended.

3. Settlement: An overfill allowance of 0.75' is recommended to compensate for residual settlement in the fill and foundation.

Prepared by:

Lorn P. Dunnigan

Lorn P. Dunnigan

Reviewed and Approved by:

Roland B. Phillips

Roland B. Phillips

Attachments

cc: W. S. Atkinson
H. M. Kautz, Upper Darby, Pennsyvania
Bernard S. Ellis, Syracuse, New York
W. L. Anderson, Syracuse, New York
R. J. McClimans, Binghamton, New York

Form SCS-354 Rev. 3/50

February 24, 1966

HT. [illegible] CL. "C" [illegible]

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA
Sheet 2 of 3

NEW YORK — Little Choconut — Site No. 2-A

Mechanical analysis: grain size distribution expressed as percent finer by dry weight. Moisture density relationships: ☒ Standard ☐ Modified.

Laboratory sample number (66W)	Field number	Location and description	Depth	Field classification	Fines .002 mm	.005	.02	.05	#200 .074	Sands #140 .105	#60 .250	#40 .42	#20 .84	#10 2.0	#4 4.76	Gravel 3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 25.4	1 1/2" 38.1	3" 76.2 mm	Atterberg LL	PI	Unified classification	Soluble salts %	Dispersion %	Curve No.	Dry density lbs/ft³	Optimum H₂O %	Dry unit weight g/cc	H₂O %	Gs	Special tests
2345	D.H. 51-A-1	¢ Dam — Core	16.5'-18.5'		16	35	83	100								Core size saved 3 1/4" x 15"						31	10	CL		89				1.6[illegible] / 1.56	2[illegible]6 / 2[illegible]	2.73	Shear [illegible]
2346	D.H. 51-A-2	" " — Core	26.5-28.5'		24	45	91	100								3 1/4" x 17"						31	2	ML		93				1.54 / 1.5[illegible]	28.8 / 23.4		
2347	203.1*	Emer. Spwy. — L. Bag * 10% + 3" Discarded from all bag samples. Glacial Till	2-12'	GM	[illegible]	17	36	[illegible]	48	46	49	49	53	55	68	[illegible]	61	86	89	92	100	23	9	GC		6	①	121.5	12.0			2.72 / 2.72 / 2.61 / 1.5	Minus #4 fraction: Apparent / Bulk dry / Absorption; Gravel fraction
2348	103.1	Borrow — L. Bag Glacial Till	2-9'	GM	8	11	[illegible]	[illegible]	47	[illegible]	[illegible]	[illegible]	55	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	92	100	25	6	GC-GM		16	②	118.5	11.0			[illegible]	Minus #4 fraction: Apparent / Bulk dry / Absorption; Gravel fraction
2349	104.2	" — L. Bag Glacial Till	2-8.5'	GM	12	18	35	45	48	49	[illegible]	[illegible]	[illegible]	60	[illegible]	[illegible]	79	83	[illegible]	91	100	29	8	GC		6	③	[illegible]	11.5			[illegible] / 1.3	Minus #4 fraction: Apparent / Bulk dry / Absorption; Gravel fraction

Dry density < #4 material

Form SCS-128
1-64

LABORATORY NO [illegible]

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	CONSOLIDATION TEST

PROJECT and STATE			SAMPLE LOCATION
LITTLE CHOCONUT NO 2A NEW YORK			S DAM
FIELD SAMPLE NO	DEPTH	GEOLOGIC ORIGIN	
DH [illegible]	16.5-17.5	Lacustrine	
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
[illegible]	[illegible]	LPD	4-18-66

CLASSIFICATION CL

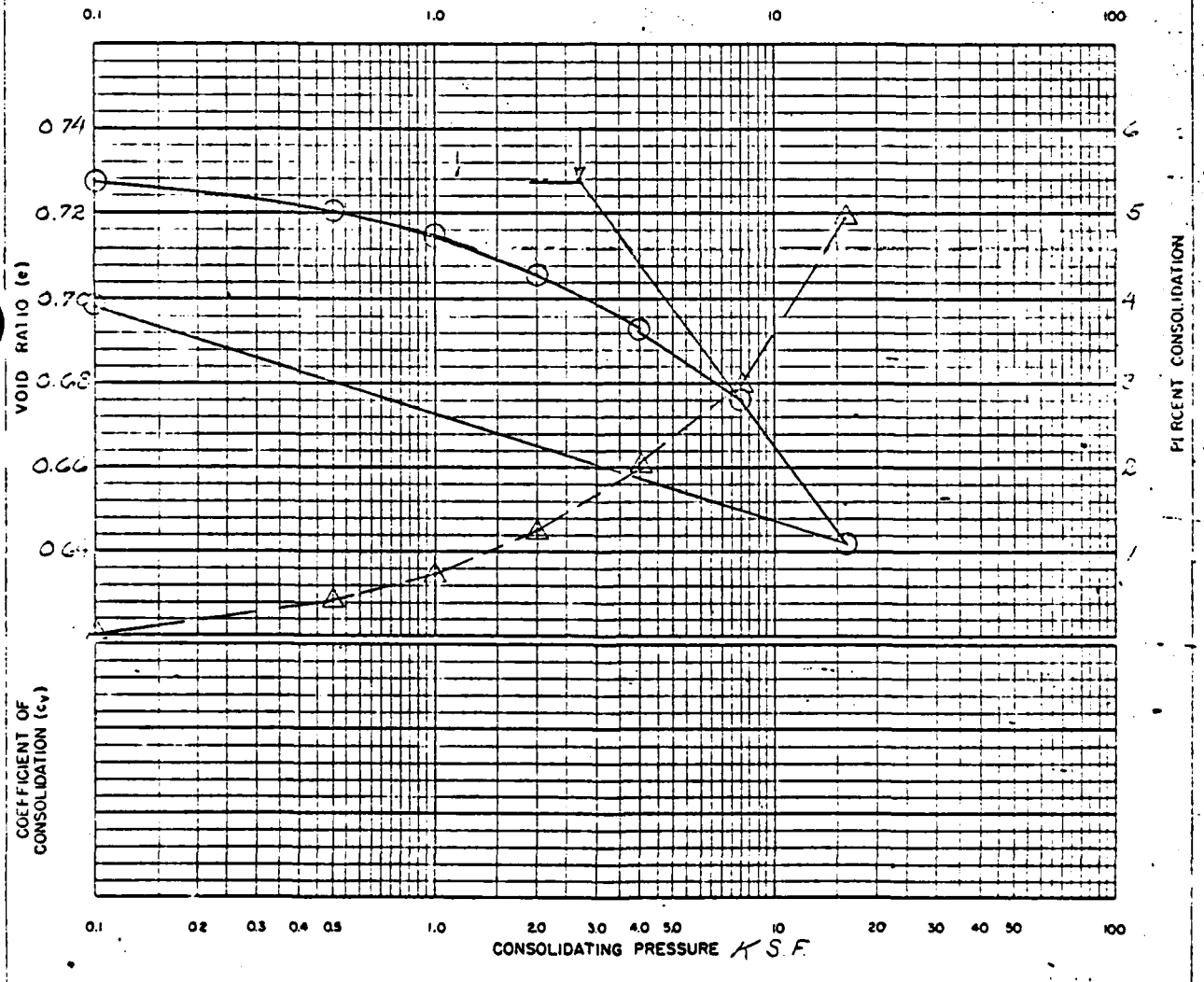
G_s 2.75 LL 31 PI 10

INITIAL DENSITY γ_d 1.48

INITIAL VOID RATIO, e_o .7277

COMPRESSION INDEX, C_c _____

TEST SPECIFICATIONS:
Saturated at 4000 PSF



REMARKS

SCS 128A

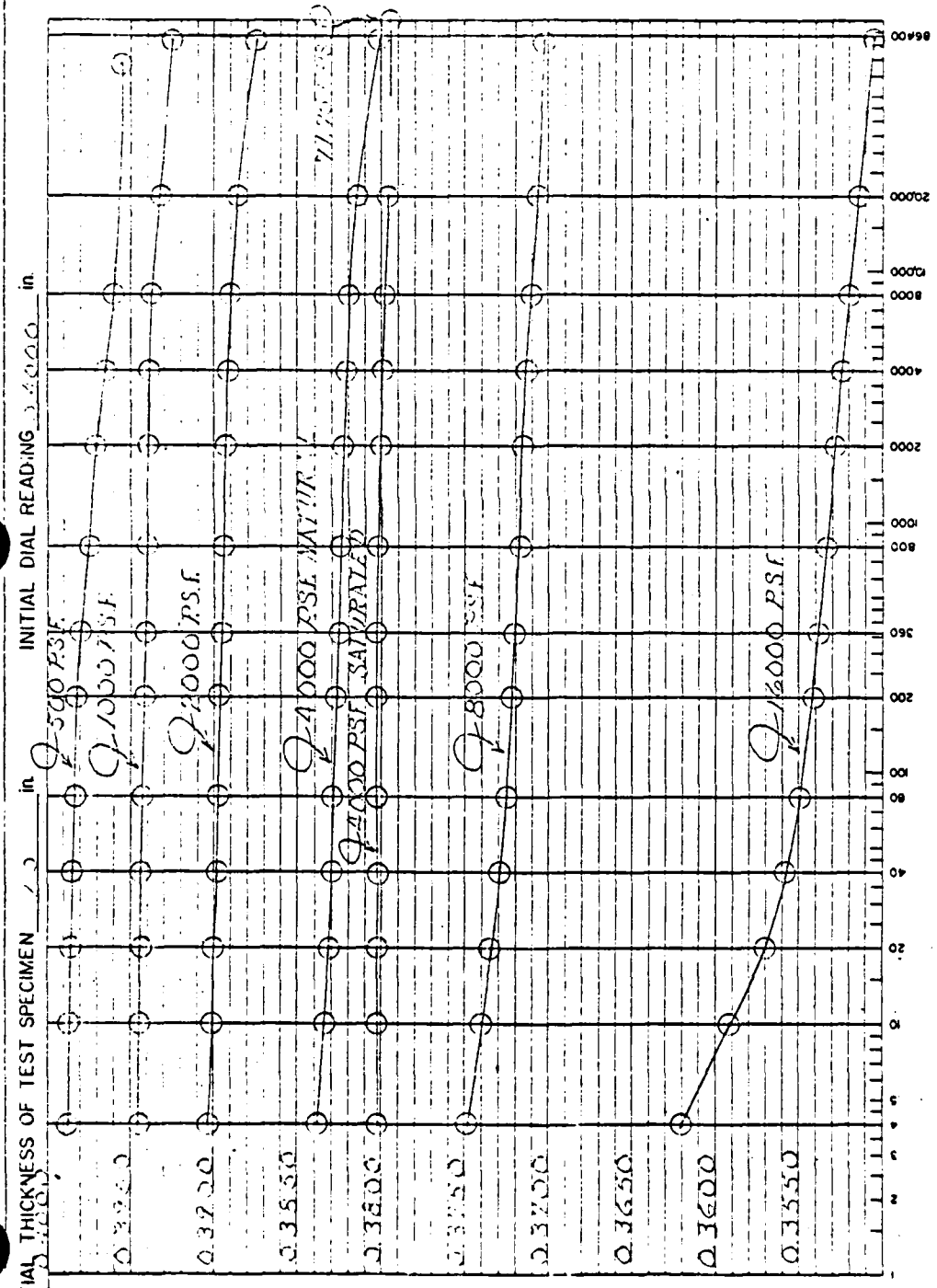
LABORATORY NO

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	LOG TIME CONSOLIDATION

PROJECT and STATE			SAMPLE LOCATION
FIELD SAMPLE NO.	DEPTH	GEOLOGIC ORIGIN	
		Lacustrine	
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
		LPD	4-18-66

INITIAL DIAL READING .4000 in.

INITIAL THICKNESS OF TEST SPECIMEN .2 in.



REMARKS

LABORATORY NO [illegible]

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL PERMEABILITY

PROJECT AND STATE: [illegible] SAMPLE LOCATION: [illegible]

FIELD SAMPLE NO	DEPTH	GEOLOGIC ORIGIN
[illegible]	[illegible]	Lacustrine

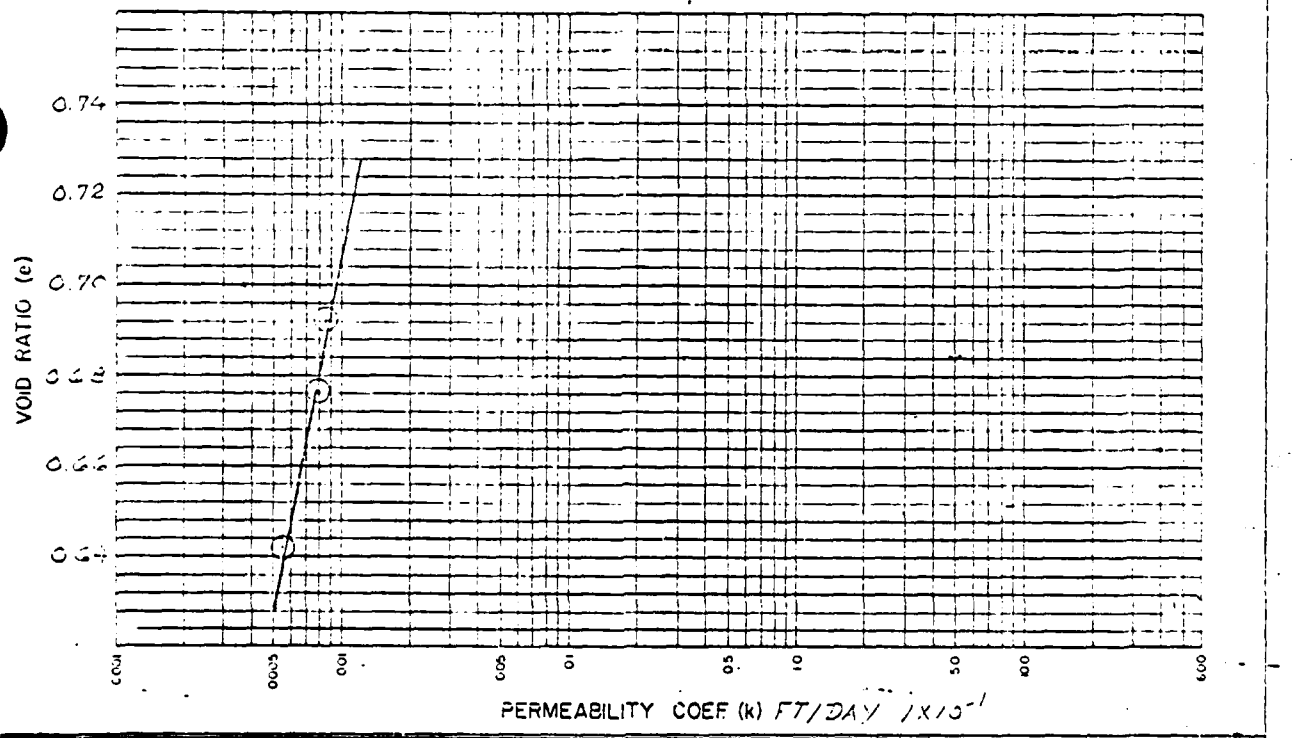
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
[illegible]	[illegible]	LPD	4-13-66

CLASSIFICATION CL LL 27 PI 10

SPECIFIC GRAVITY

TEST NO.	[illegible]	[illegible]	[illegible]	4	G_s (-)#4	2.72
INITIAL MOISTURE %					G_s (+)#4	
DRY DENSITY ☑ g/cc ☐ pcf	[illegible]	[illegible]	[illegible]		G_m(Bulk)(+) #4	
VOID RATIO	[illegible]	[illegible]	[illegible]			
PERMEABILITY COEF-T/DAY	[illegible]	[illegible]	[illegible]			
PERCOLATION COEF						
H/L DURING TEST						

TEST SPECIFICATIONS
Falling Head Permeability Test on the Consolidation Sample



REMARKS

Form SCS 355A
Rev. 6-65

LABORATORY NO. [illegible]

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST

PROJECT and STATE: [illegible] | SAMPLE LOCATION: DAM

FIELD SAMPLE NO.: [illegible] | DEPTH: 16.5-18.5 | GEOLOGIC ORIGIN:

TYPE OF SAMPLE: [illegible] | TESTED AT: [illegible] | APPROVED BY: LPD | DATE: 4-18-66

INDEX TEST DATA

USCS CL ; LL 31 ; PI 10

% FINER (mm): 0.002 11 ; 0.005 15 ;

0.074 (# 200) 100

G_s (-#4) 2.73 ; G_s (+#4) _____

STANDARD: γ_d MAX. _____ pcf; w_o _____ %

MODIFIED: γ_d MAX. _____ pcf; w_o _____ %

SPECIMEN DATA

HEIGHT 3.0 "; DIAMETER 1.4 "

MATERIALS TESTED PASSED #4 SIEVE

METHOD OF PREPARATION Trimmed From a Core Sample

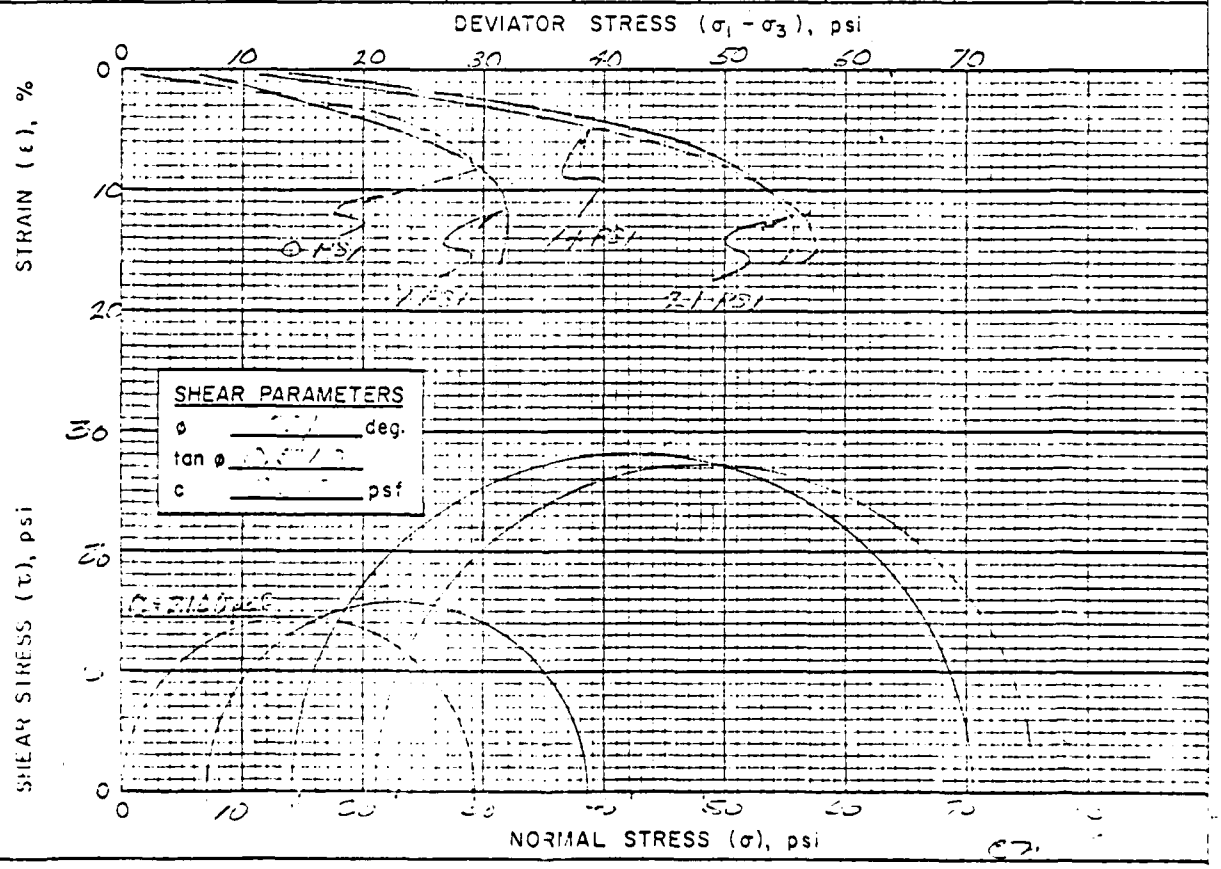
MOLDING MOISTURE _____ %

MOLDED AT _____ % OF γ_d MAXIMUM

TYPE OF TEST

UU ☐
CU ☒
$\overline{CU}$ ☐
CD ☐

DRY DENSITY			MOISTURE CONTENT, %			TIME OF CONSOLIDATION (hrs.)	MINOR PRINCIPAL STRESS σ_3 (psi)	DEVIATOR STRESS $\sigma_1 - \sigma_3$ (psi)	AXIAL STRAIN AT FAILURE, ε (%)
INITIAL pcf ☐ g/cc ☐	CONSOLIDATED pcf ☐ g/cc ☒		START OF TEST	DEG. OF SAT. AT START OF TEST	END OF TEST				
160			26.4	100.0			0	33.4	5.1
158	158		27.5	100.0	27.4	6.18	7	[illegible]	[illegible]
161	161		27.2	100.0	27.1	6.33	14	[illegible]	[illegible]
158	158		27.6	100.0	27.6	6.43	21	[illegible]	[illegible]



REMARKS

Form SCS 355A

LABORATORY NO. 66W2347

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST

PROJECT AND STATE	SAMPLE LOCATION
[illegible]	[illegible]

FIELD SAMPLE NO	DEPTH	GEOLOGIC ORIGIN
2021	29-60	Glacial Till

TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
[illegible]	[illegible]	LRD	4-19-66

INDEX TEST DATA

USCS [illegible]; LL 25; PI [illegible]

% FINER (mm): 0.002 12; 0.005 17

0.074 (#200) [illegible]

G_s (-#4) 2.71; G_s (+#4) [illegible]

STANDARD: γ_d MAX. 121.5 pcf; w_o 12.0 %

MODIFIED: γ_d MAX. ______ pcf; w_o ______ %

SPECIMEN DATA

HEIGHT 3.0 "; DIAMETER 1.4 "

MATERIALS TESTED PASSED #4 SIEVE

METHOD OF PREPARATION STATIC [illegible]

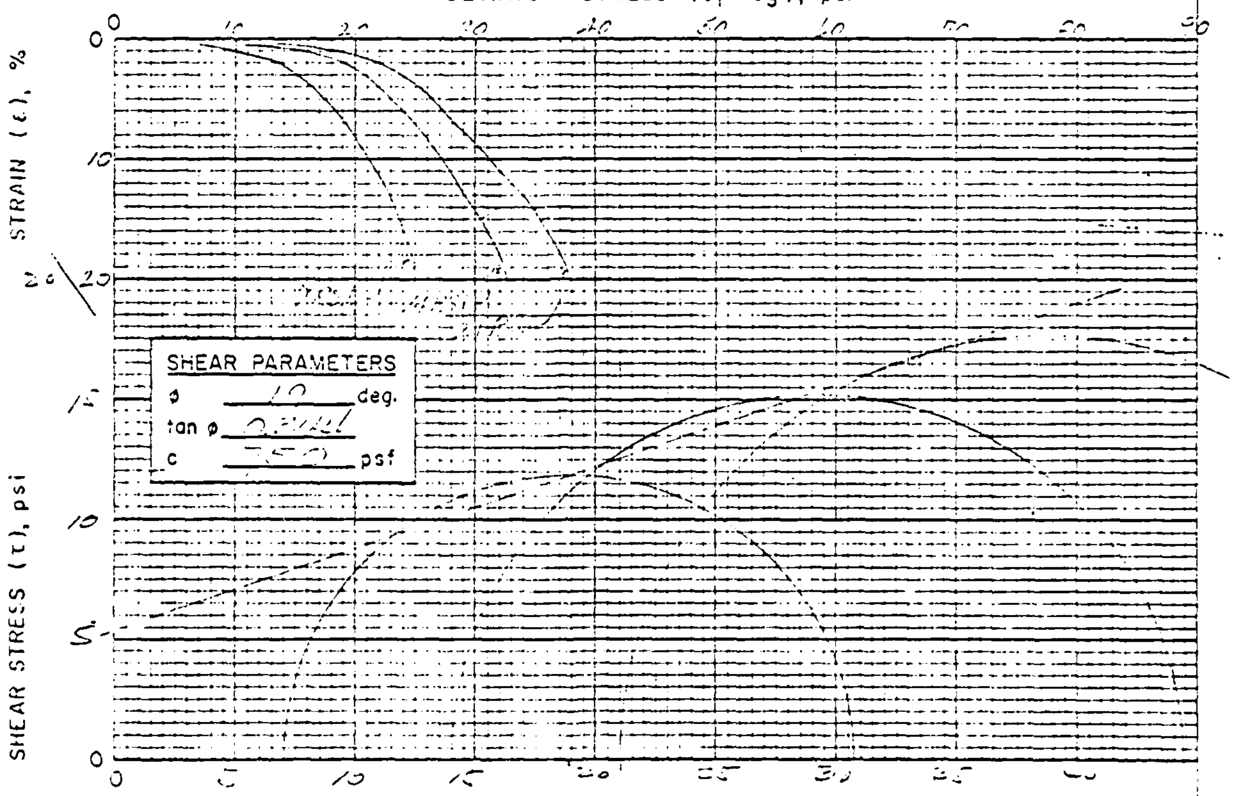
MOLDING MOISTURE 14.6 %

MOLDED AT 95.4 % OF γ_d MAXIMUM

TYPE OF TEST

UU ☐ CU ☑ $\overline{CU}$ ☐ CD ☐

DRY DENSITY INITIAL pcf ☑ g/cc ☐	DRY DENSITY CONSOLIDATED pcf ☑ g/cc ☐		MOISTURE CONTENT, % START OF TEST	DEG. OF SAT. AT START OF TEST	MOISTURE CONTENT, % END OF TEST	TIME OF CONSOLIDATION (hrs.)	MINOR PRINCIPAL STRESS σ_3 (psi)	DEVIATOR STRESS $\sigma_1 - \sigma_3$ (psi)	AXIAL STRAIN AT FAILURE, ε (%)
116.1	116.7		16.4	92.7	16.1	15.97	7	[illegible]	15
116.1	[illegible]		16.6	93.2	15.6	16.07	14	[illegible]	15
115.5	115.6		17.1	95.5	15.6	15.97	21	[illegible]	15



REMARKS TESTED @ 95.4 % STD

Form SCS-354 (5-63)

LABORATORY NO. [illegible]

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT AND STATE: [illegible] New York			
FIELD SAMPLE NO.: [illegible]	LOCATION: [illegible]		DEPTH: 2'-12'
GEOLOGIC ORIGIN: Glacial Till	TESTED AT: [illegible]	APPROVED BY: LPD	DATE: 4-18-66

CLASSIFICATION [illegible] LL [illegible] PI [illegible]

MAX. PARTICLE SIZE INCLUDED IN TEST [illegible] "

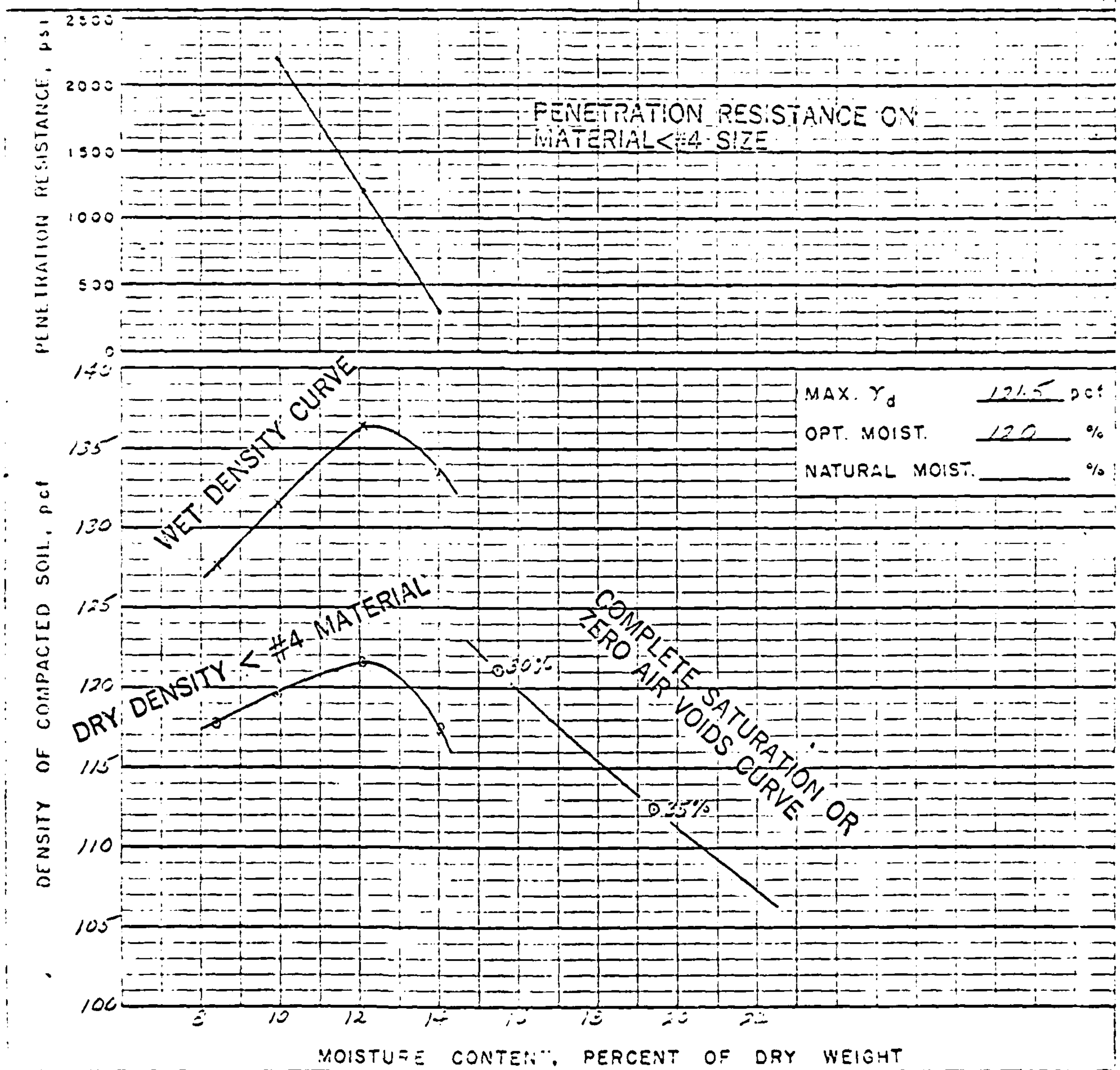
SPECIFIC GRAVITY, (G_s) MINUS NO. 4 ____ PLUS NO. 4 ____

CURVE NO. [illegible] OF [illegible]

STD. (ASTM D-698) ☒; METHOD [illegible]

MOD. (ASTM D-1557) ☐; METHOD ____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

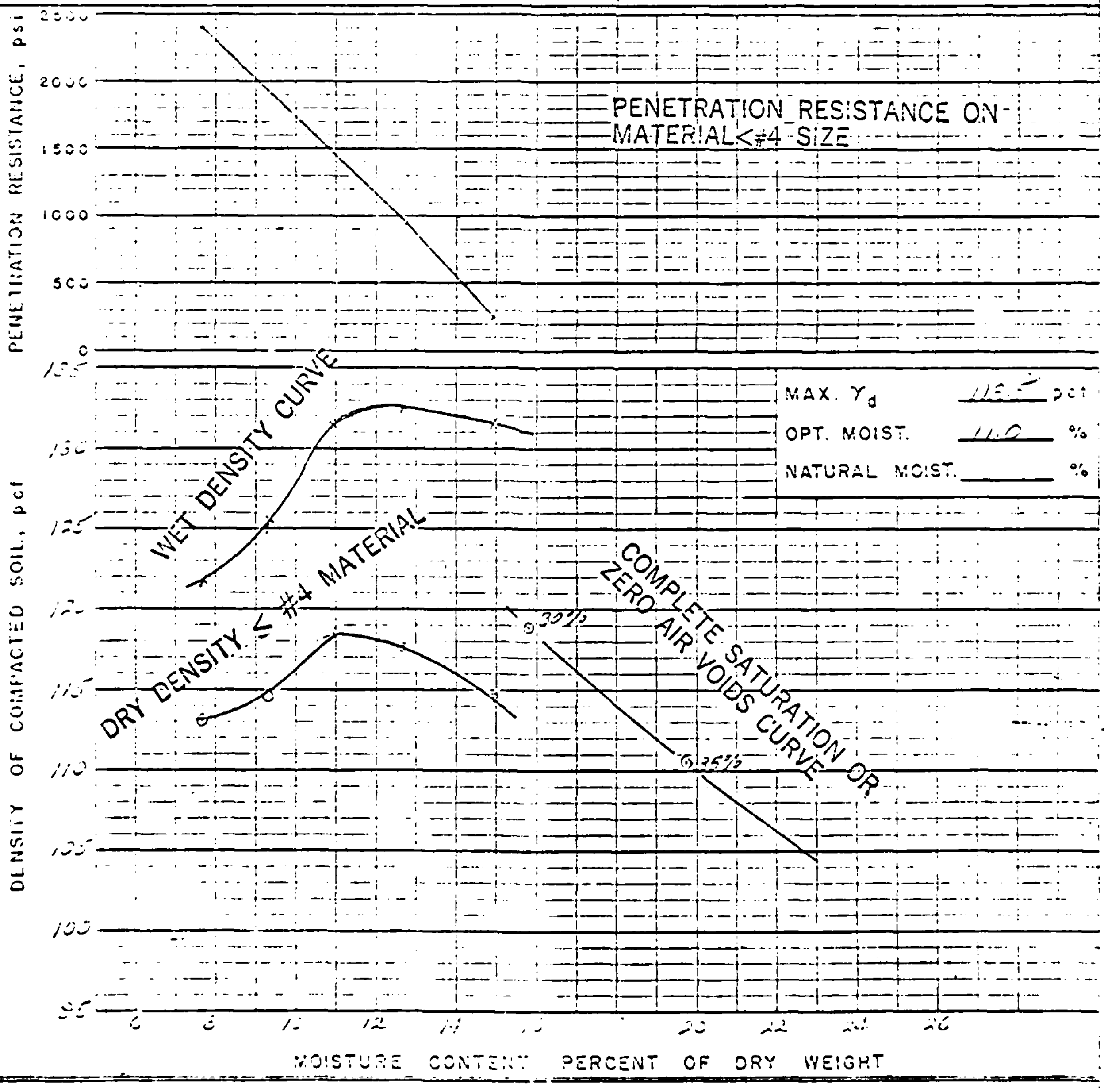
LABORATORY NO. 66-1-23-13

... TERIALS TESTING REPORT	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

FIELD SAMPLE NO.	LOCATION	DEPTH
[illegible]	[illegible]	2'-9'

	TESTED AT	APPROVED BY	DATE
Glacial Till	[illegible]	LPD	4-18-66

CLASSIFICATION GC-GM LL [illegible] PI [illegible]	CURVE NO. 2 OF 2
MAX. PARTICLE SIZE INCLUDED IN TEST [illegible] "	STD (ASTM D-698) ☐; METHOD [illegible]
SPECIFIC GRAVITY (G_s) MINUS NO. 4 [illegible]	MOD. (ASTM D-1557) ☐; METHOD
SPECIFIC GRAVITY (G_s) PLUS NO. 4 [illegible]	OTHER TEST ☐ (SEE REMARKS)



REMARKS

Form SCS 392
Rev. 5-65

LABORATORY NO C6412313

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT and STATE: Little Choconut # 2-A, New York

FIELD SAMPLE NO	LOCATION	DEPTH
104.1	Borrow	2'-3.5'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
Glacial Till	S.M.L. Lincoln	L.P.D.	4-18-66

CLASSIFICATION GC LL 29 PI 8 CURVE NO. 3 OF 3

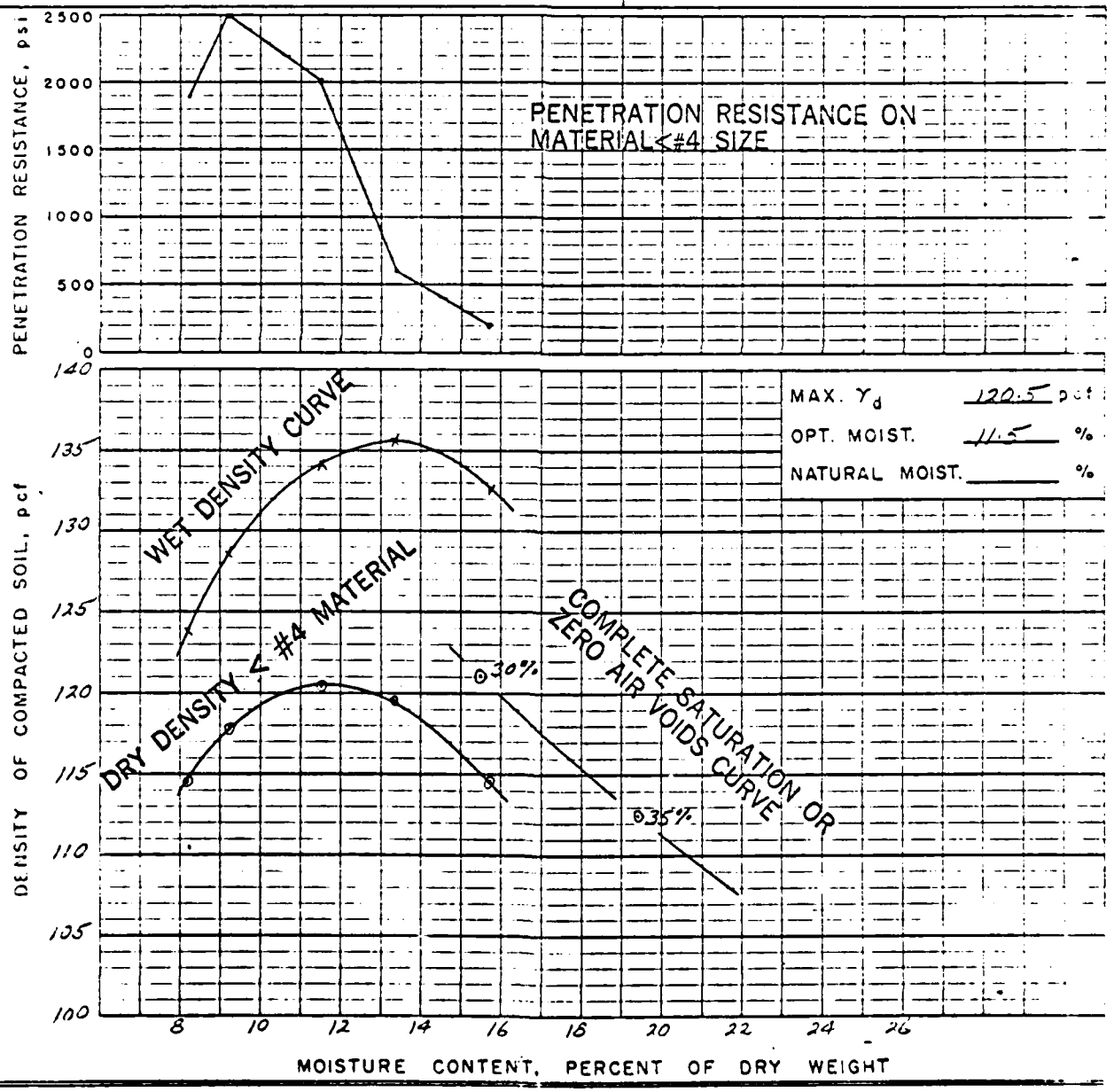
MAX. PARTICLE SIZE INCLUDED IN TEST < #4 "

SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.77 / PLUS NO. 4 2.70

STD. (ASTM D-698) ☒; METHOD A

MOD (ASTM D-1557) ☐; METHOD ____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

Form 368 (1-64)

LABORATORY NO

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	UNDISTURBED SAMPLE CHARACTERISTICS

PROJECT and STATE: Little Choconut Site No 2A New York

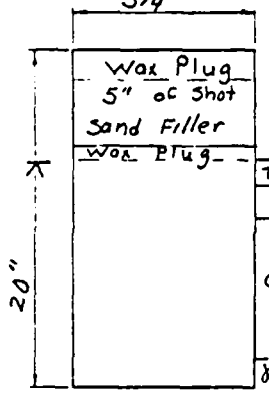
TESTED AT: SME - Lincoln | APPROVED BY: LPD | DATE: 3-7-66

FIELD SAMPLE NO	DEPTH (ft) from	DEPTH (ft) to	SAMPLE LOCATION	TYPE OF SAMPLE	LABORATORY NO
DH51-A-1	16.5'	18.5'	E Dam	Shelby	66W2345

COLOR	RELATIVE MOISTURE	CONSISTENCY	POROSITY OR STRUCTURE	TEXTURE	POCKET PENETROMETER (TSF)	VISUAL CLASSIFICATION (USCS)
Lt. Gray	wet	Firm		Silty	2.75	ML

w 25.6 % (27.2) | γ_d 1.61 g/cc (1.56 g/cc)

REMARKS - Suggest expanding packers rather than Wax For sealing.



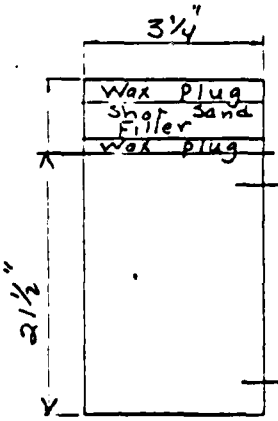
There is a few dark gray varves in the sample saved

FIELD SAMPLE NO	DEPTH (ft) from	DEPTH (ft) to	SAMPLE LOCATION	TYPE OF SAMPLE	LABORATORY NO
DH51-A-2	26.5'	28.5'	E Dam	Shelby	66W2316

COLOR	RELATIVE MOISTURE	CONSISTENCY	POROSITY OR STRUCTURE	TEXTURE	POCKET PENETROMETER (TSF)	VISUAL CLASSIFICATION (USCS)
Lt. Gray	Sat.	Firm	Varves of	Silty	2.75	ML
			Various		1.25	
			Thickness			

w ____ % | γ_d ____ g/cc

REMARKS Suggest expanding packers rather than wax for sealing.



Varved Sediments - some varves are more plastic than others - The core saved is cracked approximately 6" From the top at one of the varves. The Sam. has a Tendency To separate at the

PREVIOUS INSPECTION REPORTS

...OF ENVIRONMENTAL CONSERVATION

DAM INSPECTION REPORT
(By Visual Inspection)

Dam Number	River Basin	Town	County	Hazard Class*	Date & Inspector
96A-3628	Susq.	Union	Broome	A-B	5/28/76 KDH

Type of Construction

- ☐ Earth w/concrete spillway
- ☑ Earth w/drop inlet pipe
- ☐ Earth w/stone or riprap spillway
- ☐ Concrete
- ☐ Stone
- ☐ Timber

Use

- ☐ Water Supply
- ☑ ~~Power~~ Flood Control
- ☐ Recreation
- ☐ Fish and Wildlife
- ☐ Farm Pond
- ☐ No Apparent Use-Abandoned

Estimated Impoundment Size

- ☐ 1-5 acres
- ☐ 5-10 acres
- ☑ Over ~~10~~ acres 24. max.

Estimated Height of Dam above Streambed

- ☐ Under 10 feet
- ☐ 10-25 feet
- ☑ Over 25 feet 27

Condition of Spillway

- ☑ Service satisfactory
- ☐ In need of repair or maintenance

- ☑ Auxiliary satisfactory
- ☐ In need of repair or maintenance

Explain: _____

_____

Condition of Non-Overflow Section

- ☑ Satisfactory
- ☐ In need of repair or maintenance Explain: _____

_____

Condition of Mechanical Equipment

- ☑ Satisfactory
- ☐ In need of repair or maintenance Explain: _____

_____

Evaluation (From Visual Inspection)

- ☑ No defects observed beyond normal maintenance
- ☐ Repairs required beyond normal maintenance

*Explain Hazard Class, if Necessary _____

_____

ENGINEERING OPERATIONS AND MAINTENANCE INSPECTION REPORT

WATERSHED Little Choconut SITE NO. 7A DATE OF INSPECTION 6/9/83 DATE OF LAST INSP. _____

SPONSOR WITH OPERATIONS AND MAINTENANCE RESPONSIBILITY Broome County Soil and Water Conservation District

~~PRESENT~~ (Present) DESIGN HAZARD CLASSIFICATION C NEW CLASSIFICATION IF WARRANTED C

O & M ITEMS	SATISFACTORY/UNSATISFACTORY - EXPLANATION
1. VEGETATION	
a.) Mowing	UNSATISFACT /a.) SPILLWAY AND TOP OF DAM NEED MOWING
b.) Reseeding	SATISFACTORY /b.) NONE NEEDED
c.) Fertilizing	SATISFACTORY /c.) NONE NEEDED
d.) Excessive other uses	SATISFACTORY /d.) NONE
2. FENCING	
a.) Intact and Functional	SATISFACTORY /a.) SPLIT WIRE NEEDS REPLACING, NEW TIES NEEDED IN PLACES.
b.) Debris in Fence	SATISFACTORY /b.) NONE
c.) Gates, Locks	SATISFACTORY /c.) ANEW GATE IS RECOMMENDED
3. EMERGENCY SPILLWAY	
a.) Erosion	SATISFACTORY /a.) NONE PRESENT
b.) Excessive Seepage	SATISFACTORY /b.) SEEP ON BERM. IF MOWED, SHOULD DRY OUT.
c.) Sedimentation	SATISFACTORY /c.) NONE PRESENT.
d.) Obstructions in Channel	SATISFACTORY /d.) NONE
e.) Slips, Slides; Location	SATISFACTORY /e.) NONE
4. EMBANKMENT	
a.) Cracking, excessive settling	SATISFACTORY /a.) NONE
b.) Erosion	SATISFACTORY /b.) NONE
c.) Seepage	SATISFACTORY /c.) NONE APPARENT
d.) Other Damage (Rodents...)	SATISFACTORY /d.) NONE PRESENT

O & M ITEMS	SATISFACTORY/UNSATISFACTORY - EXPLANATION
5. RESERVOIR AREA	
a.) Undesirable Vegetation	UNSATISFACTORY /a.) CATTAILS ON BERM, INTERFERE WITH ORIFICE AREA OF RISER.
b.) Cut or Fallen Trees	SATISFACTORY /b.) NONE PRESENT
c.) Debris/Slash	SATISFACTORY /c.) REMOVE LOGS NEAR RISER TRASH RACK, REMOVE MISCELLANEOUS LOGS FROM POOL AREA
d.) Sedimentation	SATISFACTORY /d.) REMOVE CATTAILS ON BERM
6. OUTLET CHANNEL	
a.) Sedimentation	SATISFACTORY /a.) NONE
b.) Cutting and Scouring	SATISFACTORY /b.) NONE
c.) Woody Growth	SATISFACTORY /c.) GRASS SHOULD BE MOWED AND REMOVED
7. ROCK RIPRAP	
a.) Undermining	SATISFACTORY /a.) NONE
b.) Adjacent Channel Scouring	SATISFACTORY /b.) NONE
c.) Deterioration	SATISFACTORY /c.) NO DETERIORATION.
8. TRASH RACKS, GRATINGS	
a.) Accumulated Debris	SATISFACTORY /a.) REMOVE LOGS NEAR RISER AREA
b.) Broken or Missing Parts	SATISFACTORY /b.) NONE
c.) Galvanizing or Paint	SATISFACTORY /c.) NOT NEEDED
9. OTHER SPECIAL STRUCTURES	
a.) Diversions	N/A /a.)
b.) Access Roads	SATISFACTORY /b.)
c.) Waterways	N/A /c.)
d.) Other, list.....	NONE /d.)
e.) Other, list.....	NONE /e.)
10. PRINCIPLE SPILLWAY	
a.) Riser	
1.) Condition of Concrete	SATISFACTORY /1.) NO SPALLS OR CHIPPING PRESENT
2.) Seepage and Cracks	SATISFACTORY /2.) NONE OF SIGNIFICANT NATURE
3.) Condition of Transition	N/A /3.)

O & M ITEMS	SATISFACTORY/UNSATISFACTORY - EXPLANATION
10. PRINCIPLE SPILLWAY	
b.) Impact Basin N/A	
1.) Condition of Concrete	N/A /1.)
2.) Sedimentation, Debris	N/A /2.)
3.) Pipe Entrance Condition	N/A /3.)
c.) Plunge Pool	
1.) Riprap Condition	SATISFACTORY /1.)
2.) Vegetative Treatment	~~UNSATISFACTORY~~ /2.) REMOVE DEBRIS FROM POOL AND OUTLET CHANNEL
d.) Drain System	
1.) Seepage (Clean, Dirty)	~~SATISFACTORY~~ /1.) NONE PRESENT
2.) Animal Guards	~~SATISFACTORY~~ /2.) INTACT + PRESENT
e.) Pipe	
1.) Cracks, Seepage	SATISFACTORY /1.) NONE PRESENT
2.) Debris and Sedimentation	~~SATISFACTORY~~ /2.) NONE
3.) Listing of gaps greater than ~~1/8~~ 1/4 inch	Maximum joint extensibility 2 3/4"

JOINT #	1	2	3	4	5	6	7	8	9	10	11 (RISER)
12 O'Clock	-	-	-	-	-	-	-	-	-	-	-
3 O'Clock	-	-	-	-	-	-	-	-	-	-	-
6 O'Clock	-	-	-	-	-	-	-	-	-	-	-
9 O'Clock	-	-	-	-	-	-	-	-	-	3/8	-

Gap locations as looking downstream.

11. GATES AND VALVES

Estimated leakage with gate closed and adjusted 0 gpm.

General description of system Excellent condition, gate operational condition

Operational Check: Satisfactory X UNSATISFACTORY _____

12. PUMP SYSTEMS

General condition report, including operations record, fuses broken or missing, broken or missing warning lights, faulty switches, lubrication required, excessive vibration: N/A

12. PUMP SYSTEMS

General condition report, continued:---------- N/A

13. SAFETY

List all hazards present: (including broken guards, rails, rope swings, diving boards on risers, evidence of pollution, garbage) None present. Dam in good shape - safe!

RECOMMENDED REPAIRS AND METHOD OF REPAIR: Replace broken fence ties and fence. Remove cattails from [illegible] area of dam. [illegible] top of [illegible] [illegible] emergency spillway. [illegible] [illegible] [illegible] [illegible] area. [illegible] [illegible] from the outlet channel. A new gate is highly recommended.

INSPECTED BY Gary J. Page

TITLE Project Engineer

DUTY STATION Binghamton Watershed Office

NOTE: DESIGNATE NOT APPLICABLE ITEMS BY MARKING N/A.

OPERATIONS & MAINTENANCE 1980 REPORT
BROOME COUNTY SOIL & WATER CONSERVATION DISTRICT

PL-566 Sites

1. Little Choconut #1
   - Mowed dike and emergency spillway
   - Removed debris from riser and pool area
   - Operated gate

2. Little Choconut #1A
   - Mowed dike and emergency spillway
   - Operated gate
   - Removed debris from riser and pool area

3. Little Choconut #2
   - Replaced stone-lined waterway - installed 482 tons
   - Removed sediment from pool - 150 c.y.
   - Mowed dike and emergency spillway
   - Debris removed from riser and pool area
   - Operated gate

4. Little Choconut #2A
   - Repaired barbed wire fence
   - Mowed dike and emergency spillway
   - Operated gate
   - Removed debris from riser and pool area
   - Replaced gate

5. Little Choconut #2B
   - Mowed dike and spillway
   - Operated gate
   - Removed debris from riser and pool area

6. Little Choconut #2C
   - Mowed dike and spillway
   - Operated gate
   - Repaired fence
   - Installed gate on access road
   - Removed debris from riser and pool area

7. Little Choconut #2E
   - Mowed dike and emergency spillway
   - Operated gate
   - Removed debris from riser and pool area

8. Little Choconut #3C
   - Mowed dike and spillway
   - Operated gate
   - Repaired gate
   - Attempted to unplug 6" drain into riser, will require pumping dry and dredging to uncap pool end

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
R.D. # 1, County Airport Road, Johnson City, New York 13790

SUBJECT ENG-210, Engineering O&M Inspections DATE: June 20, 1980

TO Mr. Richard G. Perritt, DC
Soil Conservation Service
Farm, Home, & 4H Center
840 Front Street
Binghamton, New York 13905

Engineering Operations and Maintenance Inspections have been completed by this office on Little Choconut Site 2A and Nanticoke Site 9E. Enclosed please find copies of reports necessary for distribution to the sponsor, area conservationist, state office, and NYSDEC. In summary, the inspections turned out as follows:

LITTLE CHOCONUT SITE 2A

The site is in excellent condition overall. Minor maintenance is needed as listed below:

1. Mowing of the emergency spillway bottom.
2. Some barbed wire fence and associated ties need replacing with new materials. Please consult the AS-BUILT drawings for required types of materials.
3. A new gate is recommended for this site. The present gate is quite flimsy and could easily be vandalized.
4. Cattails along berm of the dam should be removed, along with some tree branches and logs located near the riser. Two hockey goals are situated within the flood pool area and should be removed due to potential of plugging the riser during high water conditions.
5. Grass should be removed from the outlet channel. Capacity seems to be greatly reduced due to this grass, and potential for high tailwater is present.

NANTICOKE CREEK SITE 9E

The site is in average condition. The following items need attention:

1. Mowing of spillways is needed.
2. Downstream slope of structure should be checked for ph level. If necessary, lime should be applied (moss is present beneath the crownvetch).
3. New barbed wire and ties is needed along the downstream toe of the structure. Consult the AS-BUILT drawings for required types of materials.
4. The entrance gate should be adjusted or replaced so as to allow for smooth operation. This gate should be locked at all times.
5. A major amount of debris (logs and branches) needs to be removed from

the reservoir area, riser area, and emergency spillway inlets. It will be necessary to go around the permanent pool to pick up some of the debris.
6. Top dressing and seeding, mulching of the downstream right hand crease is needed. Erosion is accelerated in this area.
7. Small willow trees need to be removed from the outlet channel.
8. Four (4) angles on the high stage trash rack (riser) need to be removed and replaced. These angles are bent to a great degree, and may jeopardize the structure during high water.
9. A trash rack is recommended for the impact basin. This is necessary for safety purposes.

Some spalling and pitting of the principle spillway pipe is noted. I do not recommend any repairs at this time. However, the pipe should be monitored for future deterioration. The riser bottom is also exhibiting pitting. The application of an epoxy such as Meta-Cote 363GP manufactured by American Metaseal Co. of Carlstadt, New Jersey should be made in the next year to ensure protection of steel reinforcement in the structure.

We will be continuing our inspections on other sites in the county during the remainder of the summer. If you have any questions concerning the repairs, please feel free to contact me.

Gary L. Page

Gary L. Page, Project Engineer
Binghamton Watershed Office

cc. Herbert J. Lyford, AC, SCS, Binghamton NY
Phillip J. Nelson, SCE, SCS, Syracuse NY
Bill Maxian, Broome County Soil and Water Cons. District

APPENDIX E

REFERENCES

REFERENCES

1. Chow, Ven Te, Editor - Handbook of Applied Hydrology. McGraw-Hill Book Company, New York, N.Y., 1964.

2. Hydrologic Engineering Center, U.S. Army Corps of Engineers, "HEC-1 Flood Hydrograph Package, Users Manual". Davis, Cal., January 1973.

3. Hydrologic Engineering Center, U.S. Army Corps of Engineers, "Flood Hydrograph Package (HEC-1), Users Manual for Dam Safety Investigations", Davis, Cal., September 1978.

4. King, Horace, and Brater, Ernest. Handbook of Hydraulics, 5th Edition. McGraw-Hill Book Company, New York, N.Y., 1963.

5. U.S. Department of the Interior. Design of Small Dams, 2nd Edition, Washington, D.C., 1973.

APPENDIX F

DRAWINGS

FINCH HOLLOW, LITTLE CHOCONUT & TR
WATERSHED PROJECT

FLOODWATER RETARDING DAM NO. 2-A

DRAINAGE AREA	406 ACRES
TOTAL STORAGE (TO EMERGENCY SPILLWAY CREST)	175 ACRE FT.
WATER SURFACE AREA (SEDIMENT POOL)	4 ACRES
HEIGHT OF DAM	27 FEET
VOLUME OF FILL	~~30,000~~ 31,551 CUBIC YA

BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

BY

COUNTY OF BROOME

WITH THE ASSISTANCE OF THE

SOIL CONSERVATION SERVICE

OF THE

U S DEPARTMENT OF AGRICULTURE

INDEX

NUT & TROUT BROOK
ROJECT

AS BUILT

DAM NO. 2-A

406 ACRES
175 ACRE FT.

4 ACRES

27 FEET
~~30,000~~ CUBIC YARDS
31,551

PROTECTION AND
ACT

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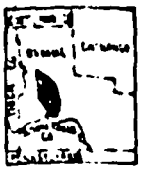


AS BUILT 12/2/68

FINCH HOLLOW, LITTLE CHOCONUT & TROUT BROOK
WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2-A
COVER SHEET

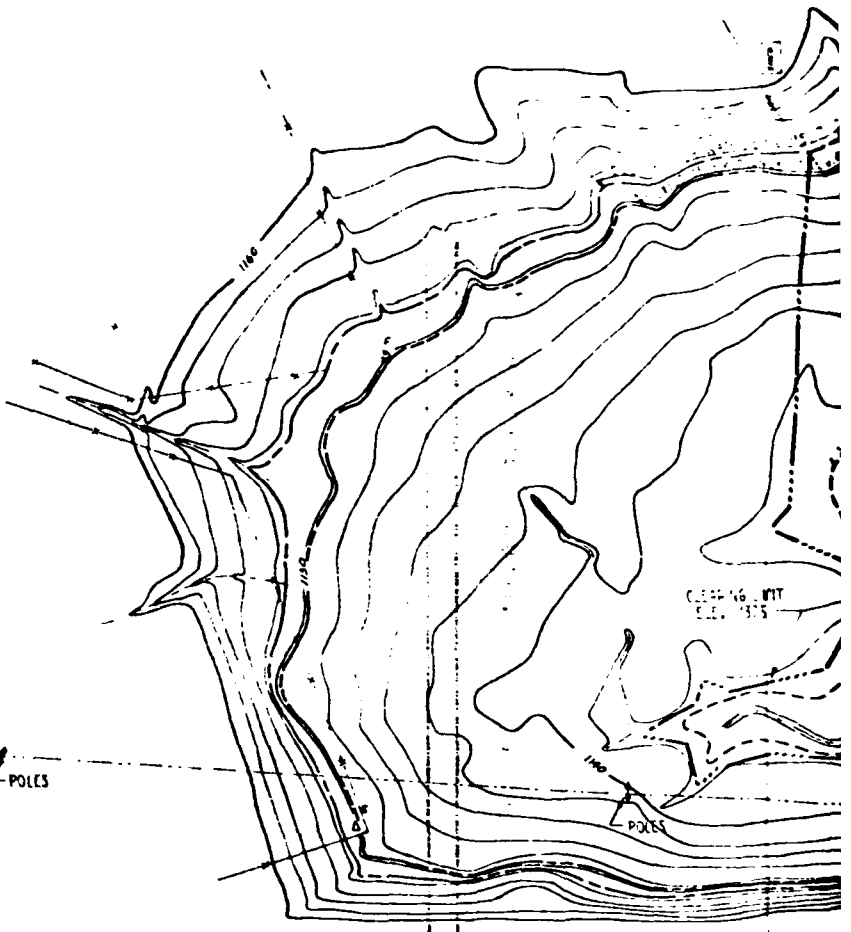
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

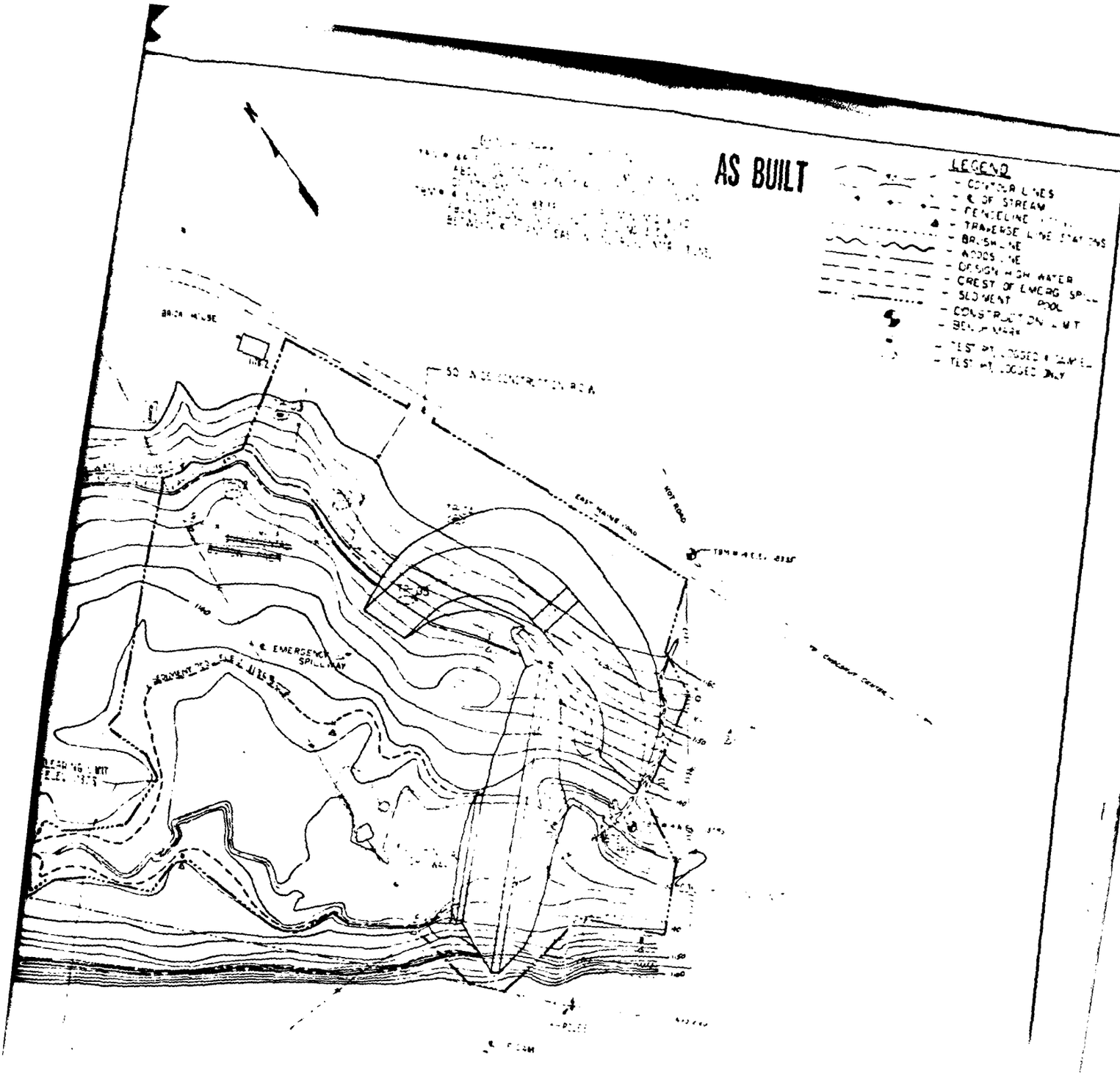
W. YOLTON
L.C. IBBITSON
1/66

NY-2016 -P

GENERAL NOTES

1 AREAS UNDER THE DAM, THE EMERGENCY SPILLWAY AND SUPPLEMENTAL BORROW AREA TO BE CLEARED AND GRUBBED LIMITS OF AREA TO BE CLEARED AND GRUBBED SHALL BE AS STAKED IN THE FIELD BY THE ENGINEER (SPEC 2A)
2 AREA UPSTREAM FROM DAM AND BELOW ELEVATION 1315 (MSL) SHALL BE CLEARED LIMITS OF AREA TO BE CLEARED SHALL BE AS STAKED IN THE FIELD BY THE ENGINEER (SPEC 1B)
3 ALL FENCES IN WORK AREA TO BE REMOVED AS STRUCTURAL REMOVAL (SPEC 3A)
4 BOTTOM SECTION OF EMERGENCY SPILLWAY FROM STA 3+50 TO STA 7+30 TO BE COVERED WITH 6" OF TOPSOIL ADDITIONAL TOPSOIL THAT IS SUITABLE FOR USE WILL BE INCORPORATED WITHIN THE SLOPES OF THE EARTH FILL AS DIRECTED BY THE ENGINEER
5 FILL PLACEMENT IN DIKE SHALL BE IN ACCORDANCE WITH PROCEDURE ON SHEET 5 FOR THE DAM





AS BUILT 12/2/68

CURVE DATA

LAYOUT DATA FOR CURVE II

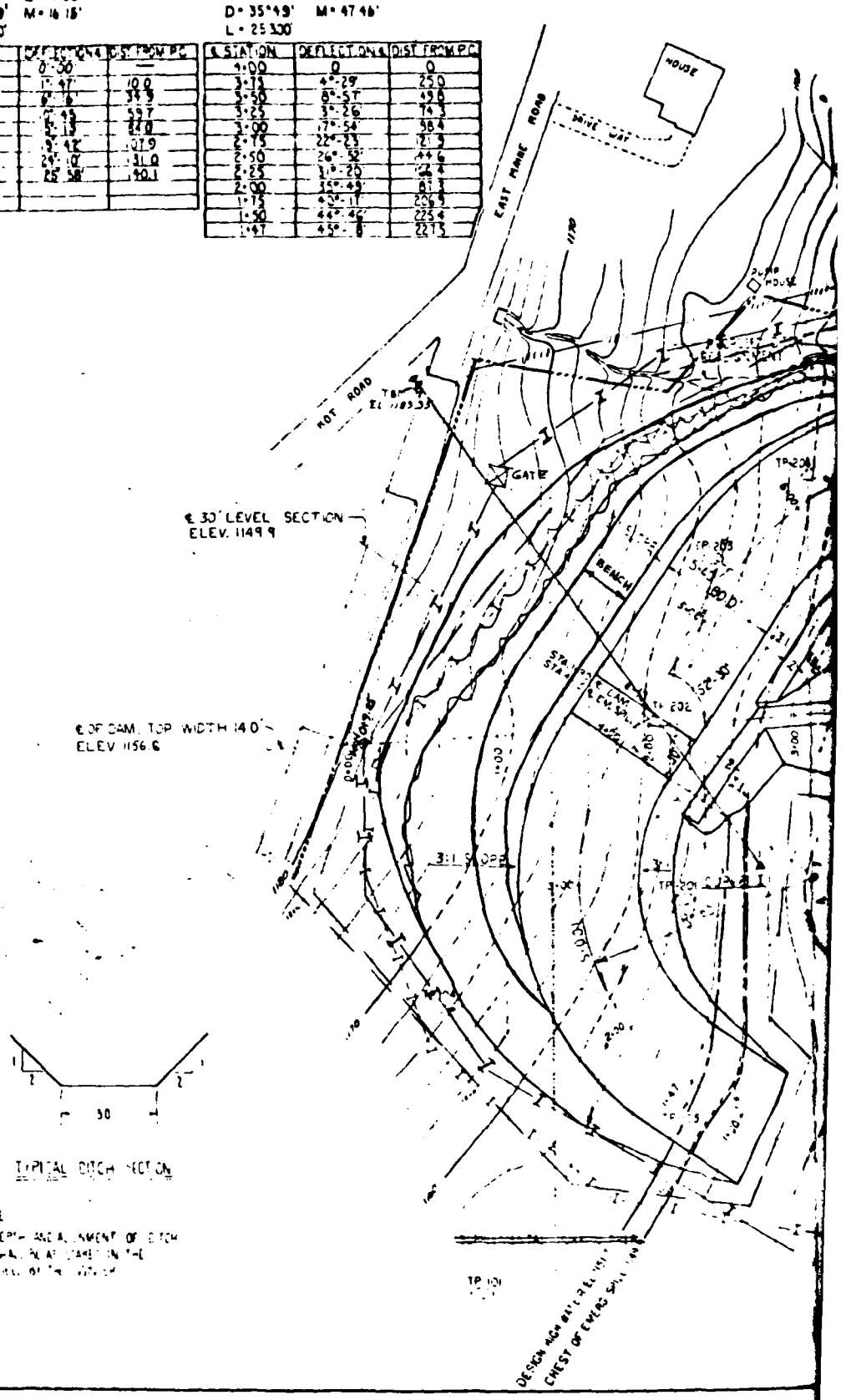
Δ = 54° 55' T = 77.91'
R = 160.36' E = 17.96'
D = 35° 49' M = 16.15'
L = 145.00'

STATION	DEFLECTION Δ	DIST FROM P.C.
5+90	0° 30'	—
6+00	12° 47'	10.0
6+25	9° 6'	34.9
6+00	7° 43'	59.7
6+75	5° 13'	84.0
6+82	3° 42'	91.9
6+50	9° 42'	107.9
6+75	29° 10'	131.0
6+85	25° 58'	140.1

LAYOUT DATA FOR CURVE I

Δ = 90° 36' T = 161.68'
R = 160.00' E = 67.47'
D = 35° 49' M = 47.46'
L = 253.00'

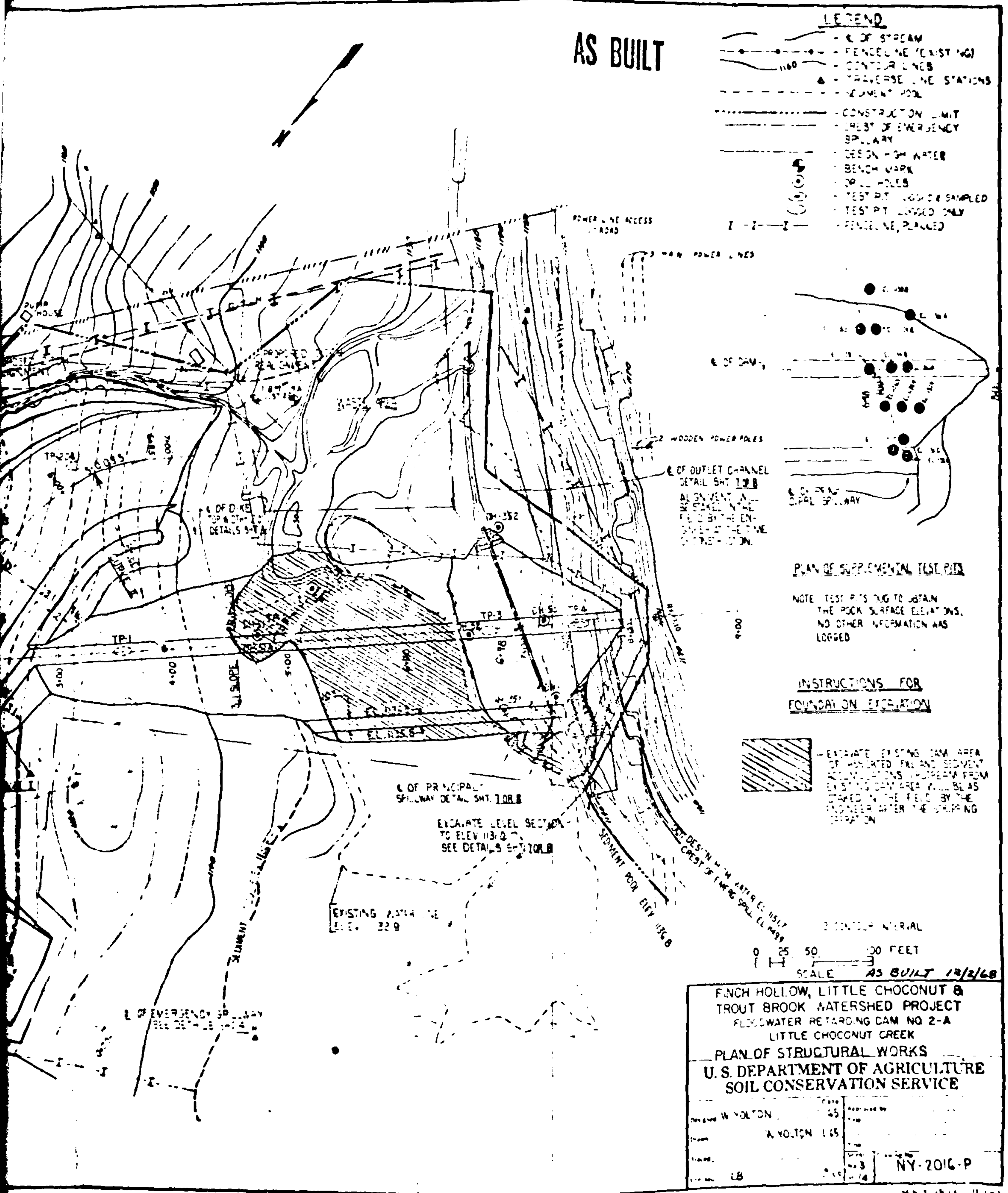
STATION	DEFLECTION Δ	DIST FROM P.C.
4+00	0	0
3+75	4° 29'	25.0
3+50	8° 57'	49.8
3+25	13° 26'	74.3
3+00	17° 54'	98.4
2+75	22° 23'	121.9
2+50	26° 52'	144.6
2+25	31° 20'	166.4
2+00	35° 49'	187.3
1+75	40° 17'	207.3
1+50	44° 46'	226.4
1+47	45° 8'	227.5

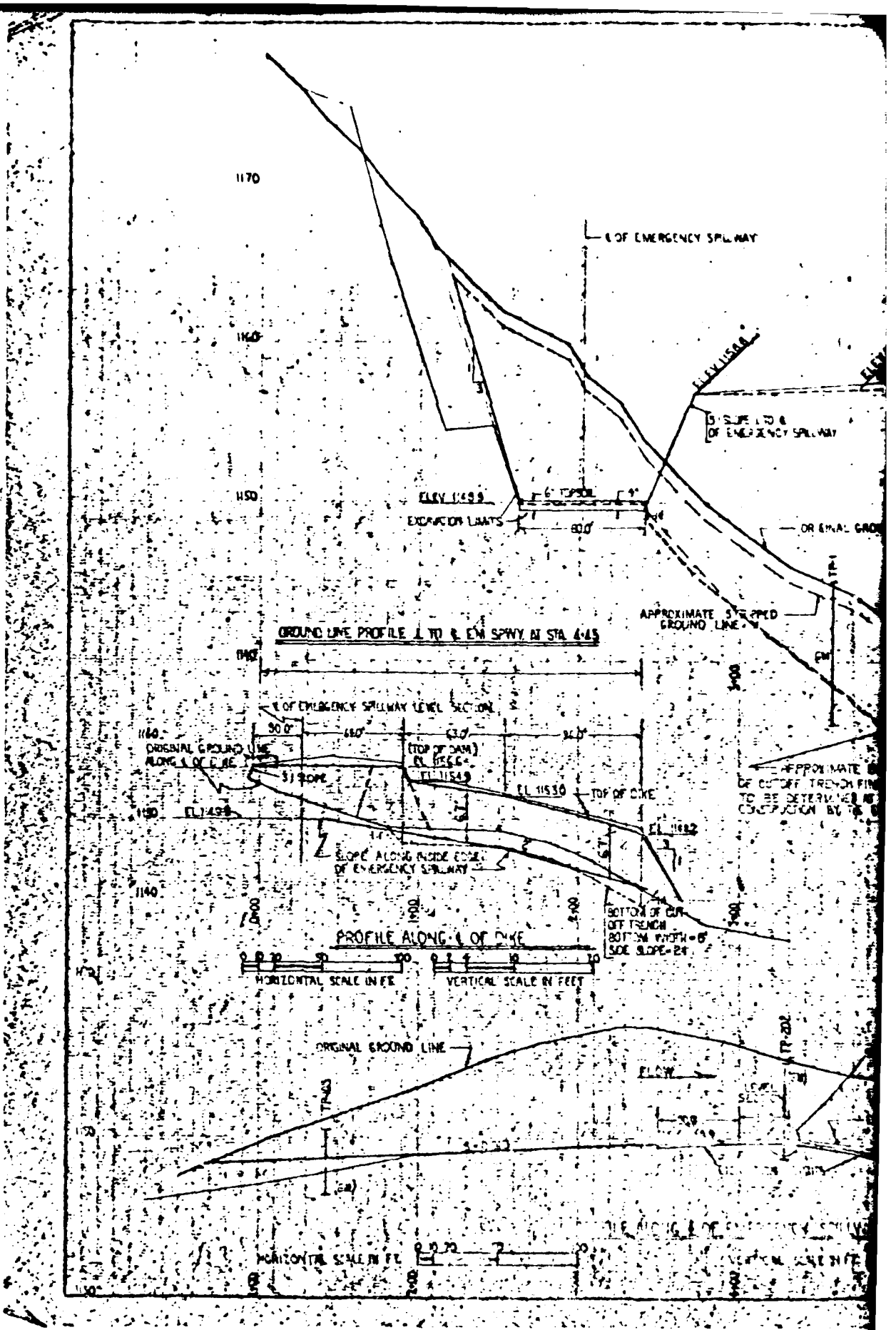


TYPICAL DITCH SECTION

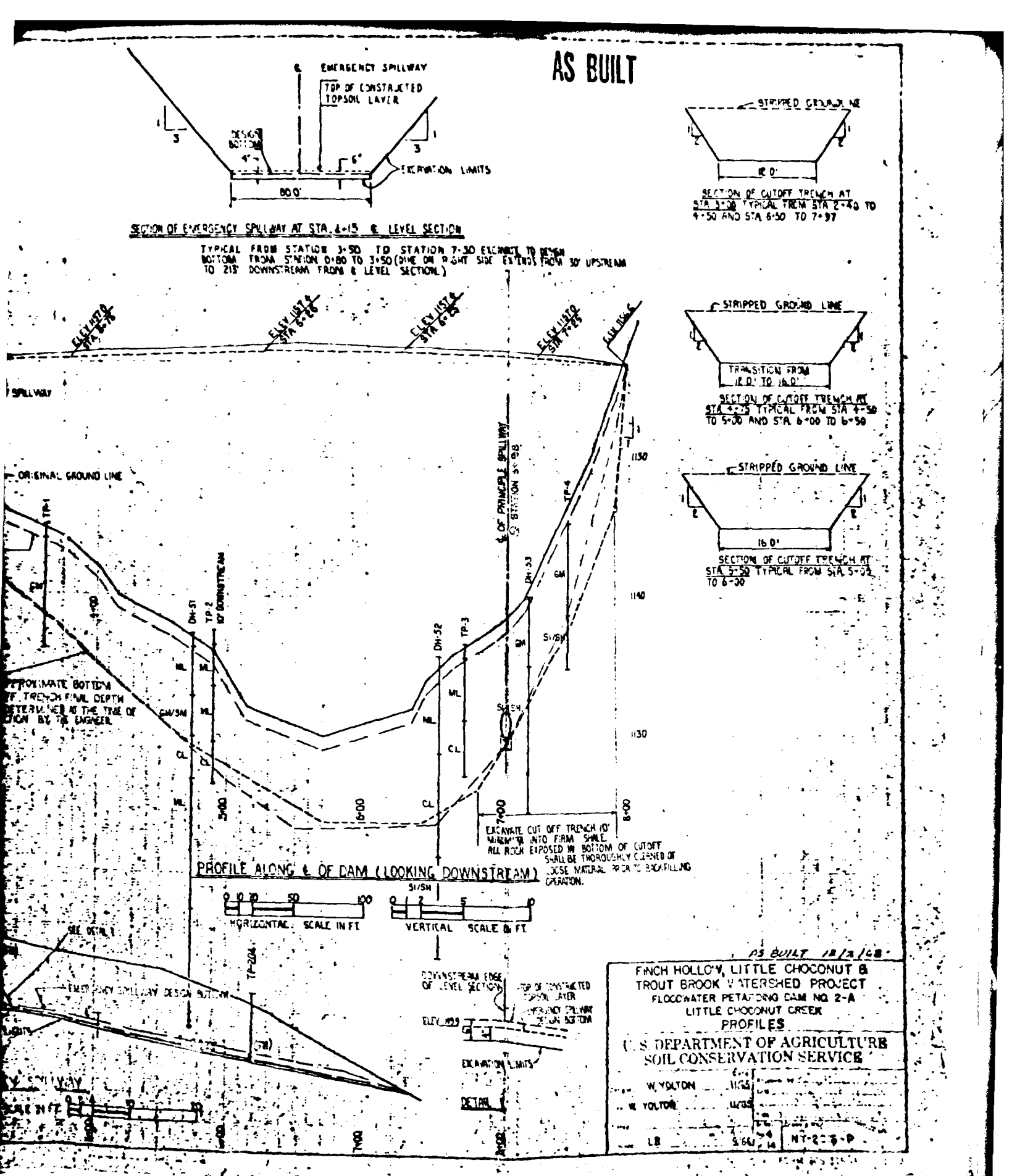
NOTE

DEPTH AND ALIGNMENT OF DITCH SHALL BE AS DIRECTED BY THE ENGINEER


AS BUILT
LEGEND
POWER LINE ACCESS ROAD
WASTE
TP-1
TP-3
TP-4
DH-352
℄ OF OUTLET CHANNEL DETAIL SHT. 12 B
℄ OF PRINCIPAL SPILLWAY DETAIL SHT. 10 OR 8
EXCAVATE LEVEL SECTION
SEE DETAILS SHT. 10 OR 8
2 WOODEN POWER POLES
℄ OF DAM
PLAN OF SUPPLEMENTAL TEST PITS
NOTE: TEST PITS DUG TO OBTAIN THE ROCK SURFACE ELEVATIONS. NO OTHER INFORMATION WAS LOGGED
INSTRUCTIONS FOR FOUNDATION EXCAVATION
SEDIMENT POOL ELEV
DESIGN HIGH WATER
CREST OF EMERG SPILL
EXISTING WATER LINE
SEDIMENT
℄ OF EMERGENCY SPILLWAY
SCALE
AS BUILT 12/2/68
FINCH HOLLOW, LITTLE CHOCONUT & TROUT BROOK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO. 2-A
LITTLE CHOCONUT CREEK
PLAN OF STRUCTURAL WORKS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NY-2016-P


1170
1160
1150
1140
℄ OF EMERGENCY SPILLWAY
ELEV 1149.9
EXCAVATION LIMITS
60.0'
APPROXIMATE STRIPPED GROUND LINE
GROUND LINE PROFILE ⊥ TO ℄ EM SPWY AT STA 4+45
℄ OF EMERGENCY SPILLWAY LEVEL SECTION
30.0'
66.0'
63.0'
36.0'
ORIGINAL GROUND LINE ALONG ℄ OF DIKE
(TOP OF DAM) EL 1154.9
EL 1153.0
TOP OF DIKE
EL 1149.5
EL 1148.2
SLOPE ALONG INSIDE EDGE OF EMERGENCY SPILLWAY
BOTTOM OF CUT-OFF TRENCH
BOTTOM WIDTH = 6'
SIDE SLOPE = 2:1
PROFILE ALONG ℄ OF DIKE
HORIZONTAL SCALE IN FEET
VERTICAL SCALE IN FEET
ORIGINAL GROUND LINE
FLOW
HORIZONTAL SCALE IN FT

AS BUILT

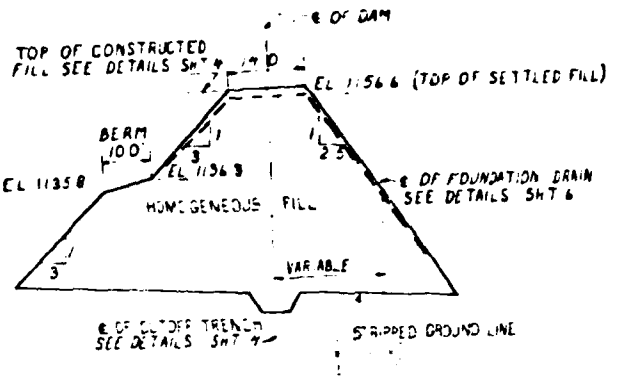


AS BUILT 12/2/68

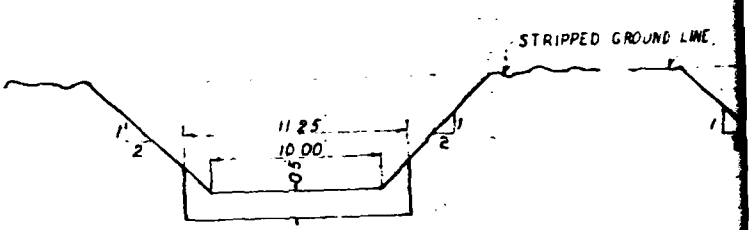
FINCH HOLLOW, LITTLE CHOCONUT & TROUT BROOK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO. 2-A
LITTLE CHOCONUT CREEK
PROFILES

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

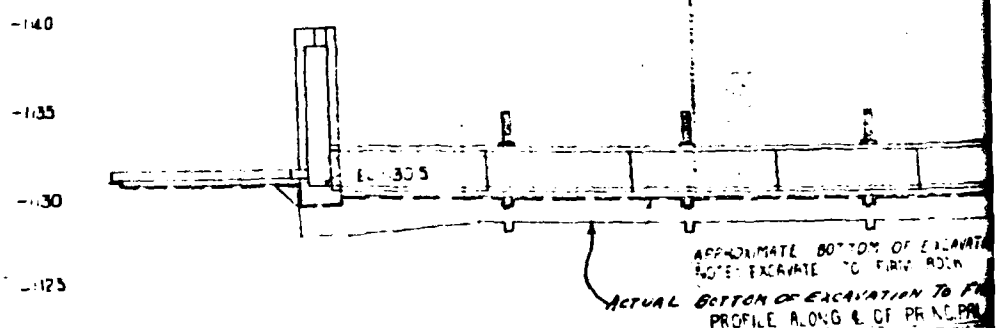
W. YOLTON	11/65		
E. YOLTON	11/65		
LB	5/66	9 of 14	NY-2-6-P



TYPICAL SECTION OF DAM
NOT TO SCALE



NOTE EXCAVATE SLOTS 1125-05'
PRINCIPAL SPILLWAY EXCAVATION AT ANTI-SEEP COLLARS



AS BUILT

SETTLED FILL)

RATION DRAIN
LS SHT 6

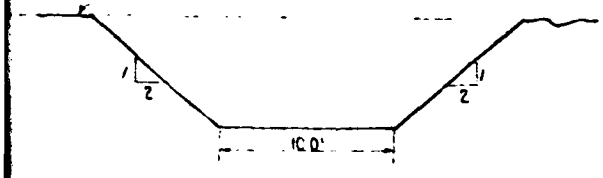
LINE

EARTH FILL REQUIREMENTS					
MATERIAL	MAX ROCK SIZE	MAX LIFT 1/	REQ'D WATER CONTENT 2/	COMPACTION 3/	
				CLASS	DEFINITION
SANDY GRAVEL FROM EMERGENCY SPILLWAY & SUPPLEMENTAL BORROW AREA REPRESENTED BY TP10 FROM 10' TO 90' TP15 FROM 10' TO 85 TP23 FROM 10' TO 100	6"	9"	2 PERCENTAGE PTS BELOW TO 2 PERCENTAGE PTS ABOVE OPTIMUM	A	95% MAX DENSITY BY ASTM D698, METHOD A

1/ MAXIMUM LIFT THICKNESS PRIOR TO COMPACTION
2/ WATER CONTENT AT TIME OF COMPACTION
3/ FOR TYPICAL COMPACTION CURVES SEE SHEET 13

NOTE THE FOUNDATION SURFACE THROUGH THE BASE AREA OF THE DAM SHALL BE SCARIFIED TO A DEPTH OF 6 INCHES AND COMPACTED PRIOR TO PLACEMENT OF FILL MATERIAL

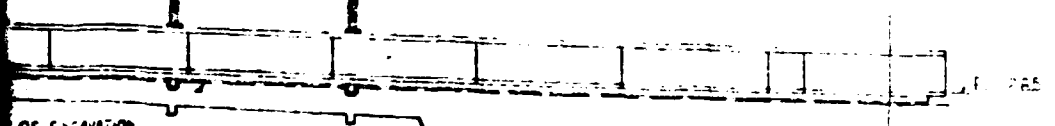
GROUND LINE



SECTION OF PRINCIPAL SPILLWAY AT STA 1+50

TYPICAL SECTION OF PRINCIPAL SPILLWAY EXCAVATION

TYPICAL FROM UPSTREAM END OF POND DRAIN PIPE TO END OF CONCRETE BEDDING UNDER 24" PIPE AT THE OUTLET



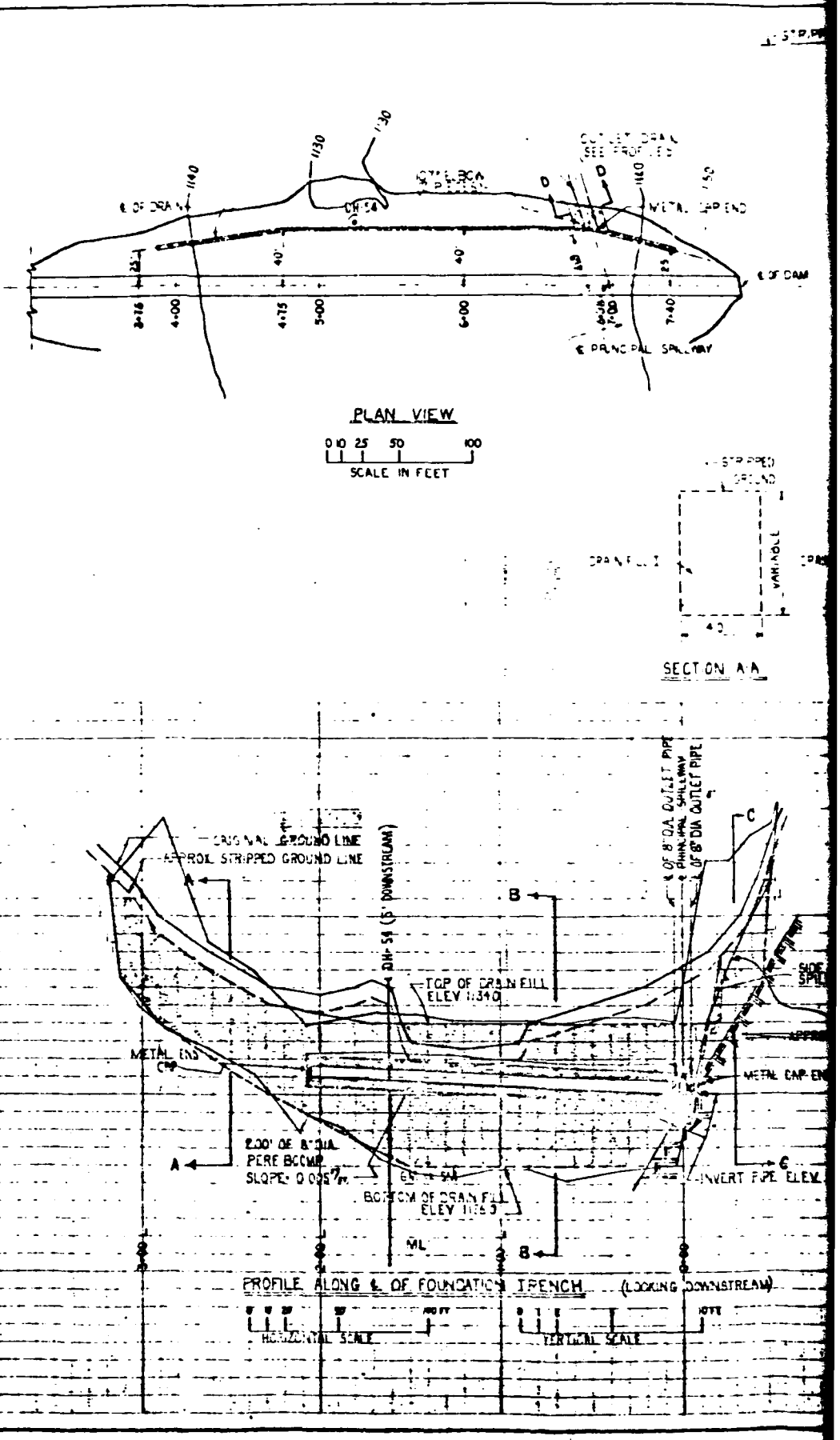
OF EXCAVATION
RM ROCK
DOWN TO FIRM ROCK
PRINCIPAL SPILLWAY

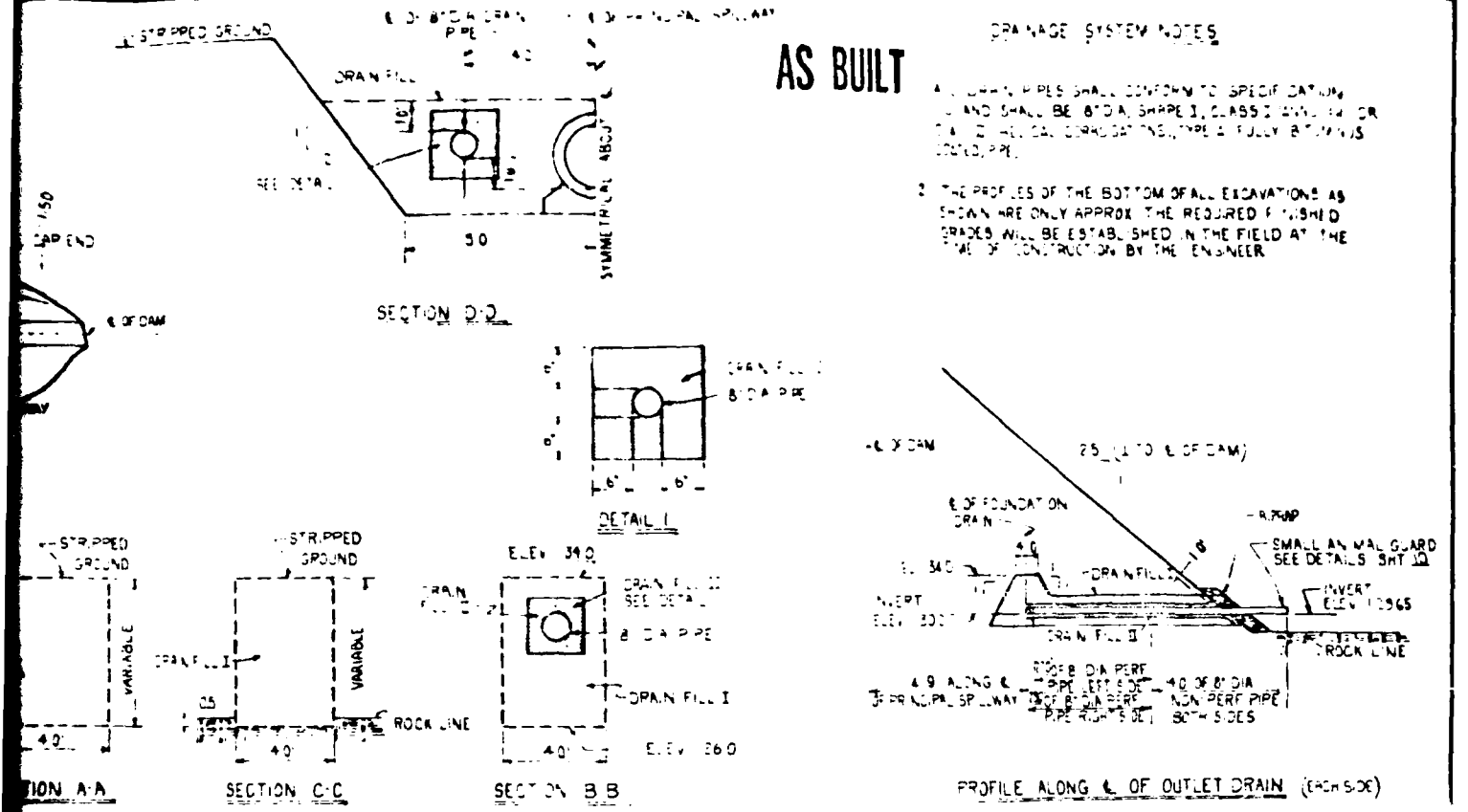
AS BUILT 12/2/68

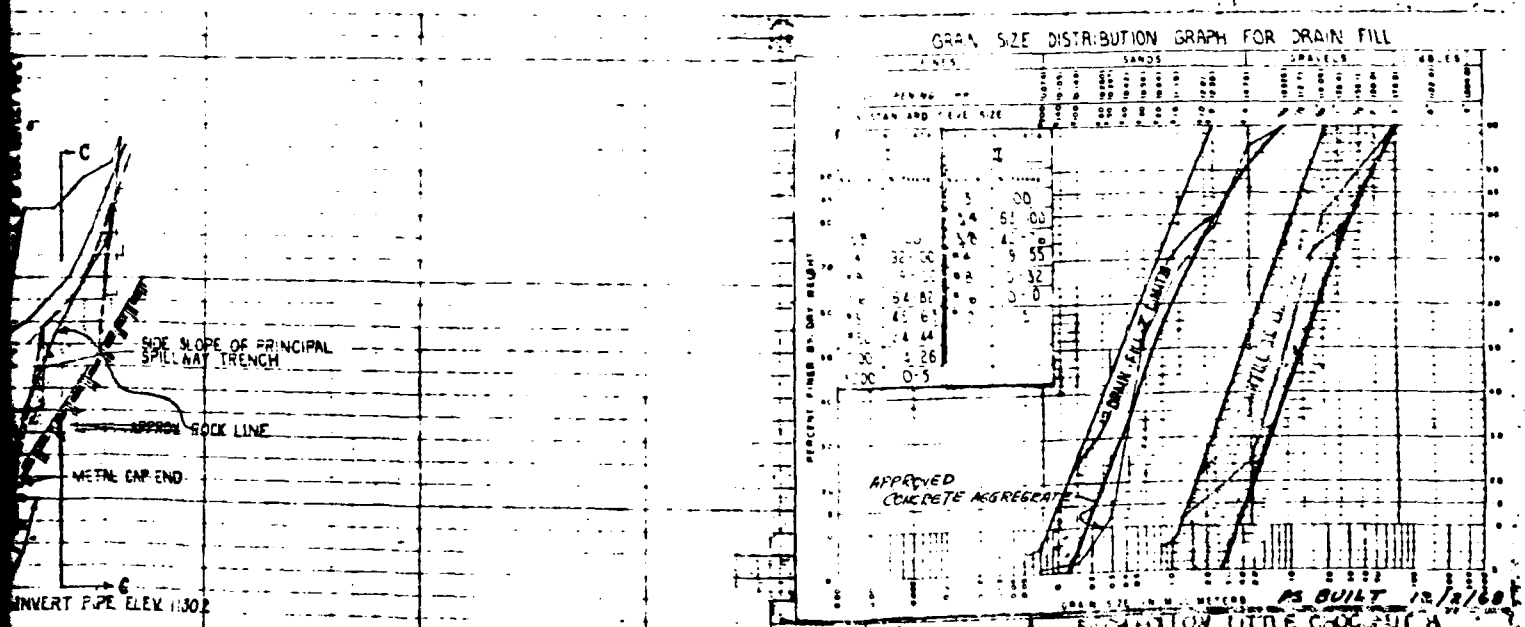
FINCH HOLLOW, LITTLE CHOCONUT & TROUT BROOK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2-A
LITTLE CHOCONUT CREEK
FILL PLACEMENT & PRIN SPILLWAY EXCA

L C IBBITSON 8/66

NY-2016-P


1140
1130
1130
OUTLET DRAIN (SEE PROFILES)
METAL CAP END
℄ OF DRAIN
℄ OF DAM
℄ PRINCIPAL SPILLWAY
PLAN VIEW
0 10 25 50 100
SCALE IN FEET
STRIPPED GROUND
DRAIN FILL
VARIABLE
SECTION A-A
ORIGINAL GROUND LINE
APPROX. STRIPPED GROUND LINE
TOP OF DRAIN FILL ELEV. 1134.0
METAL END CAP
℄ OF 8" DIA OUTLET PIPE
℄ PRINCIPAL SPILLWAY
OF 8" DIA OUTLET PIPE
METAL CAP END
BOTTOM OF DRAIN FILL ELEV. 1116.5
INVERT PIPE ELEV.
PROFILE ALONG ℄ OF FOUNDATION TRENCH (LOOKING DOWNSTREAM)
HORIZONTAL SCALE
VERTICAL SCALE

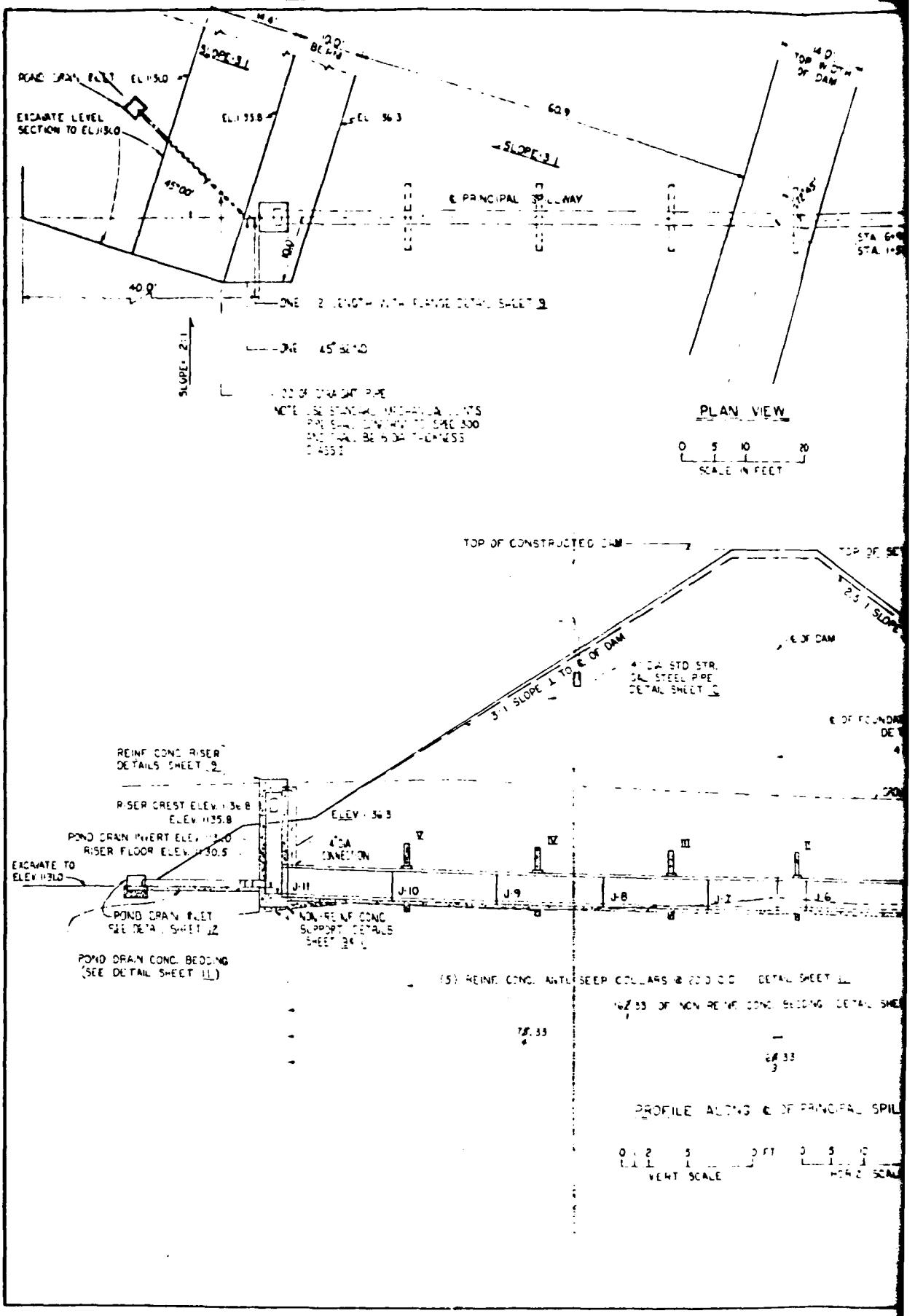




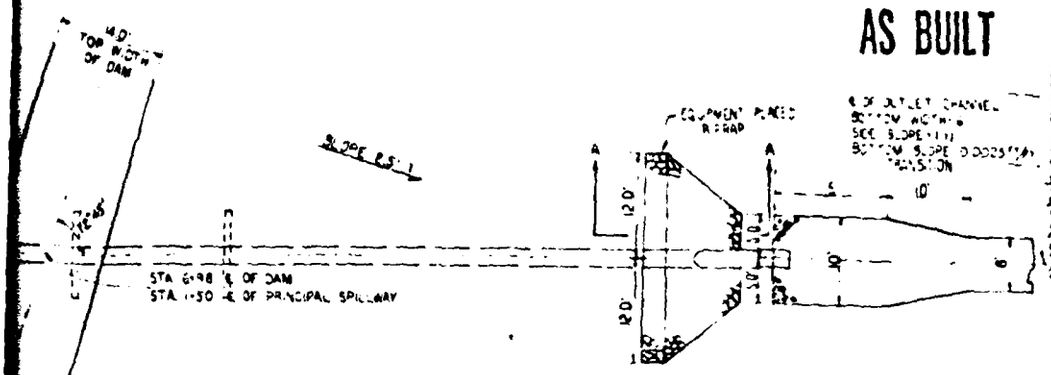
FINCH FOLLOW, LITTLE CHOCONUT
TROUT BROOK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2-A
LITTLE CHOCONUT CREEK
DRAINAGE SYSTEM DETAILS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	J.H. HARRINGTON	8/60
	L.C. IBBITSON	8/60
Drawn	J. SHERRILL	8/60
Traced		
Checked	L.B.	9/61
Approved by		
Title		
Date		
Sheet No.	8 of 14	
Drawing No.	NY-206-P	


SLOPE 3:1
EXCAVATE LEVEL SECTION TO EL 1350
EL 1358
EL 1363
SLOPE 3:1
℄ PRINCIPAL SPILLWAY
40.0'
SLOPE 2:1
PLAN VIEW
0 5 10 20
SCALE IN FEET
TOP OF CONSTRUCTED DAM
3:1 SLOPE ⊥ TO ℄ OF DAM
℄ OF DAM
REINF CONC RISER DETAILS SHEET 9
RISER CREST ELEV 1358
ELEV 1358
ELEV 1363
POND DRAIN INVERT ELEV 1340
RISER FLOOR ELEV 1330.5
EXCAVATE TO ELEV 1330
J-11
J-10
J-9
J-8
POND DRAIN OUTLET SEE DETAIL SHEET 12
NON-REINF CONC SUPPORT DETAILS SHEET 36
POND DRAIN CONC BEDDING (SEE DETAIL SHEET 11)
PROFILE ALONG ℄ OF PRINCIPAL SPIL
VERT SCALE

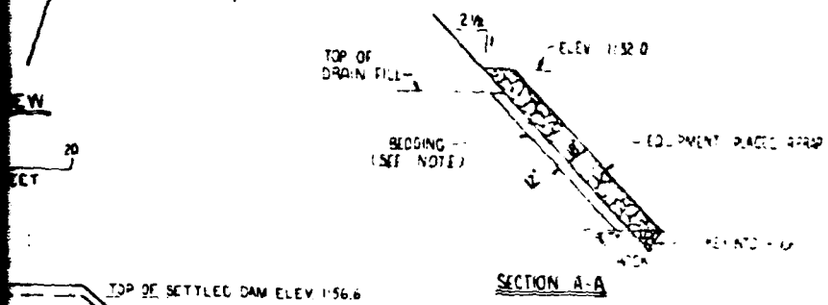
AS BUILT



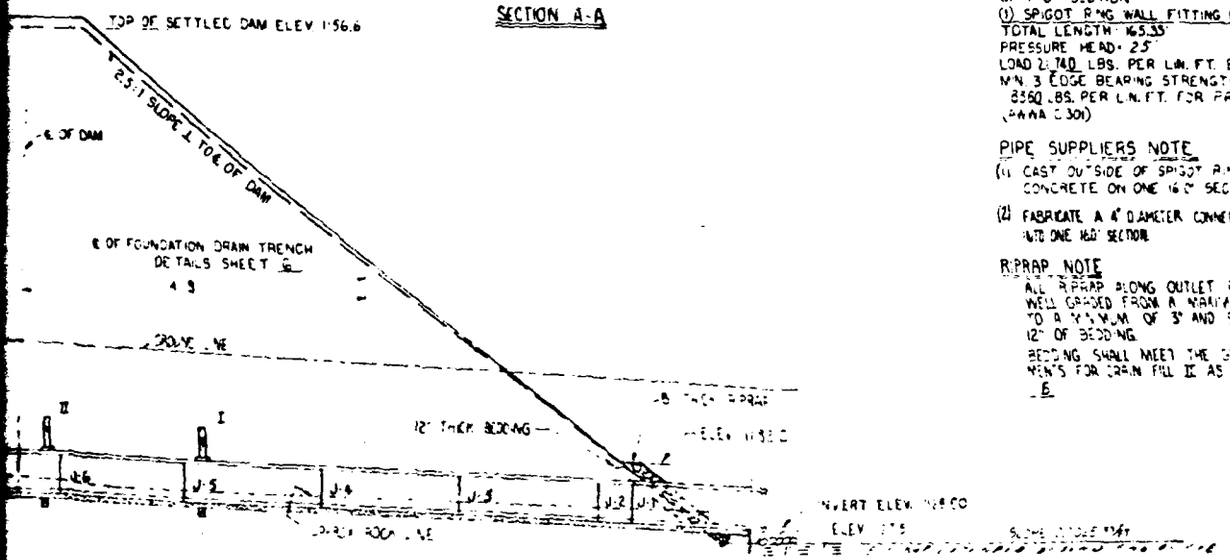
JOINT	DIST. FROM OUTLET	INVERT OF 24" DIA PIPE	SLOPE
OUTLET	0	1128.60	4%
J-1	16	1128.8	
J-2	20	1128.87	
J-3	36	1129.08	
J-4	52	1129.29	
J-5	68	1129.5	
J-6	84	1129.72	
J-7	100	1129.93	
J-8	116	1130.14	
J-9	132	1130.36	
J-10	148	1130.57	
J-11	164	1130.78	

NOTE: ABOVE DIMENSIONS FOR LENGTHS OF PIPE ARE BASED ON NOMINAL LENGTHS AND DO NOT INCLUDE CREEP

COLLAR	DIST FROM OUTLET	INVERT OF 24" DIA PIPE
I	66	1129.48
II	86	1129.79
III	106	1130.01
IV	126	1130.28
V	146	1130.48



SECTION A-A



24" I.D. REINF. CONC. PIPE
(10) 16'-0" SECTIONS
(1) 4'-0" SECTION
(1) SPIGOT RING WALL FITTING FOR 12" WALL
TOTAL LENGTH 165.33'
PRESSURE HEAD: 25'
LOAD 2,740 LBS. PER LIN. FT. BASED ON O.D. OF 24" MIN. 3 EDGE BEARING STRENGTH FOR 0.01" CRACK: 8360 LBS. PER LIN. FT. FOR PRESTRESSED PIPE (AWWA C 301)

PIPE SUPPLIERS NOTE

(1) CAST OUTSIDE OF SPIGOT RING WITH CONCRETE ON ONE 16'-0" SECTION

(2) FABRICATE A 4" DIAMETER CONNECTION INTO ONE 16'-0" SECTION

RIPRAP NOTE

ALL RIPRAP ALONG OUTLET CHANNEL SHALL BE WELL GRADED FROM A MAXIMUM SIZE OF 8" TO A MINIMUM OF 3" AND SHALL BE LAID ON 12" OF BEDDING.

BEDDING SHALL MEET THE GRADATION REQUIREMENTS FOR DRAIN FILL II AS SHOWN ON SHEET 6

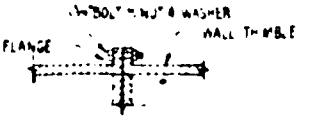
AS BUILT 12/2/68

USE THIS SHEET FOR PIPE CONDUITS FURNISHED IN 16'-0" SECTIONS

FINCH HOLLOW, LITTLE CHOCONUT & TROUT BROOK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2-A
LITTLE CHOCONUT CREEK
PLAN PROFILE OF PRINCIPAL SPILLWAY

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

L.C. IBBITSON	7/66	
C. ANGELO	7/66	
		NY-2C6-P



DETAIL "I"

RISER CONSTRUCTION JOINT DETAIL

MANHOLE ASSEMBLY

1 18"-29" OPENING MANHOLE COVER MODEL R-6665-FH SERIES, NEENAH FOUNDRY COMPANY OR APPROVED EQUIVALENT

2 EXPOSED HEX HEAD BOLTS

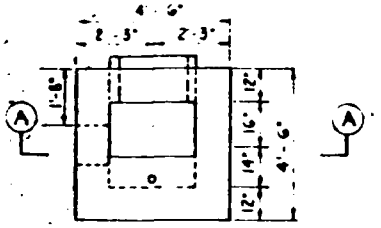
3 TYPE-D LIFT HANDLE

4 BRASS BOLTS

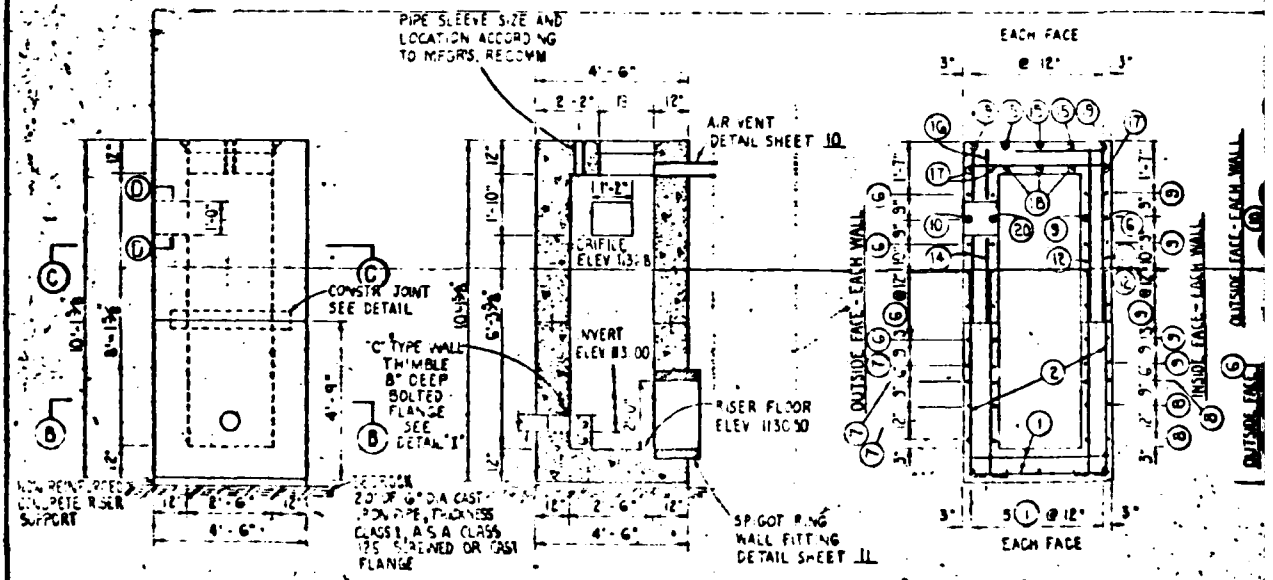
TYPICAL SLIDE GATE NOTES

1 6" DIA FLAT FRAME SLIDE GATE (SELF CONTAINED UNIT)
2 CLASS 10-2
3 SLIDE GATE SHALL CONFORM TO SPECIFICATION 301 AND SHALL BE TYPE WGS
4 "C" TYPE WALL THIMBLE 8" DEEP
5 PIPE SLEEVE, STEM & STEM GUIDES SIZED & SPACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS REMOVABLE T-HANDLE WRENCH, WRENCH SOCKET AND TOP OF STEM STORED WITHIN PIPE SLEEVE.
6 PAINT IN ACCORDANCE WITH CONST SPEC 22
7 HOLES DRILLED IN BACK FLANGE OF WALL THIMBLE BY GATE MANUFACTURER ACCORDING TO ASA CLASS 125 FLANGE SPEC

DIA OF BOLT CIRCLE = 9½"
NO OF BOLT HOLES = 8
DIA OF BOLT HOLES = ⅞"



PLAN VIEW



UPSTREAM ELEVATION

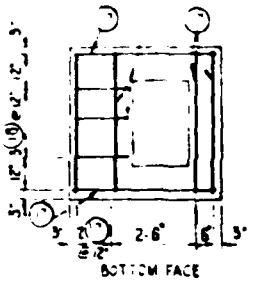
SECTION ALONG CENTERLINE

SECTION A-A

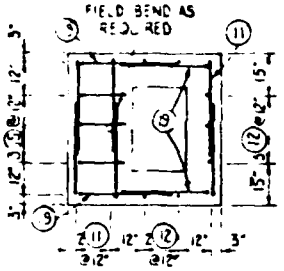
AS BUILT

STRUCTURAL CARBON STEEL PLATE
STEEL PLATE IN WALL TO BE
AROUND RISER JOINT TO BE
BOLTED

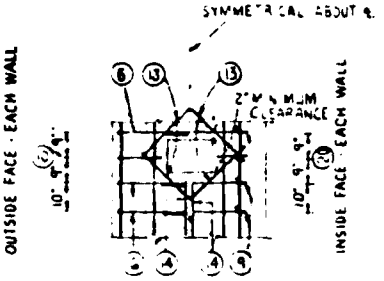
FIELD BEND AS REQUIRED



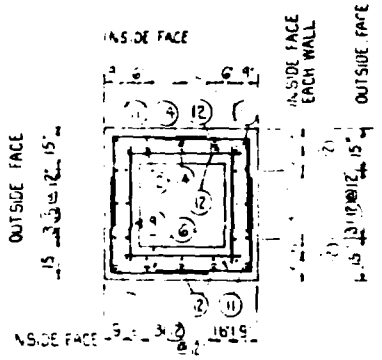
FIELD BEND AS REQUIRED



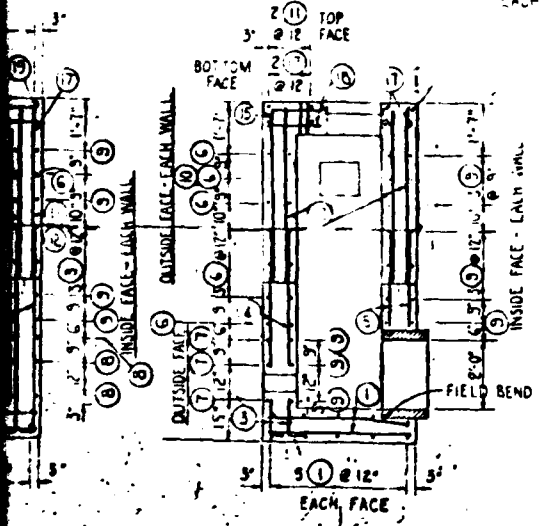
PLAN VIEWS



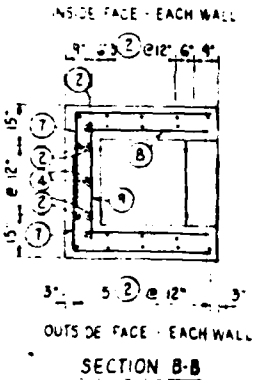
SECTION D-D



SECTION C-C



SECTION ALONG CENTERLINE

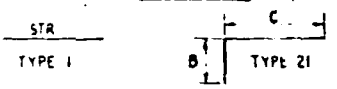


SECTION B-B

STEEL SCHEDULE

MARK	STEEL	QUANTITY	LENGTH	TYPE	B	C	TOTAL LENGTH
1	5	20	4-0	1			80-0
2	5	22	6-8	21	6-1	0-7	146-8
3	5	2	1-7	21	1-0	0-7	3-2
4	5	2	4-0	1			8-0
5	5	6	2-9	1			16-6
6	5	36	5-10	21	2-11	2-4	211-6
7	5	6	7-0	21	2-11	4-1	42-0
8	5	6	3-9	1			22-6
9	5	10	3-6	1			35-0
10	5	2	4-2	21	2-11	1-3	8-4
11	5	6	8-0	21	5-2	2-10	48-0
12	5	21	5-3	1			111-3
13	5	8	2-3	1			18-0
14	5	2	2-4	1			4-8
15	5	3	6-11	21	5-2	1-4	20-9
16	5	2	1-6	1			3-0
17	5	6	4-0	1			24-0
18	5	3	1-5	1			4-3
19	5	4	4-5	21	2-11	1-6	17-8
20	5	2	1-0	1			2-0

BAR TYPES



RISER QUANTITIES

STEEL

NO 5 BAR ---- 8514 LN FT ---- 81 LBS

TOTAL -- 81 LBS

CONCRETE

REINFORCED ---------- 5.7 CU YDS

CONSTRUCTION DETAILS

1. ALL BAR DIMENSIONS ARE MEASURED TO THE OUTSIDE EDGE OF ALL BENDS
2. RADIUS OF BENDS EQUALS 3 BAR DIAMETERS
3. ALL REINFORCING STEEL PLACED IN CONCRETE POURED AGAINST THE GROUND SHALL HAVE A MINIMUM OF 3" CLEAR COVER
   ALL REINFORCING STEEL PLACED IN CONCRETE POURED IN FORMS SHALL HAVE A MINIMUM OF 2" CLEAR COVER
4. ALL EXPOSED EDGES OF CONCRETE TO HAVE A 3/4" CHAMFER UNLESS OTHERWISE NOTED.

0 1 2 3 4

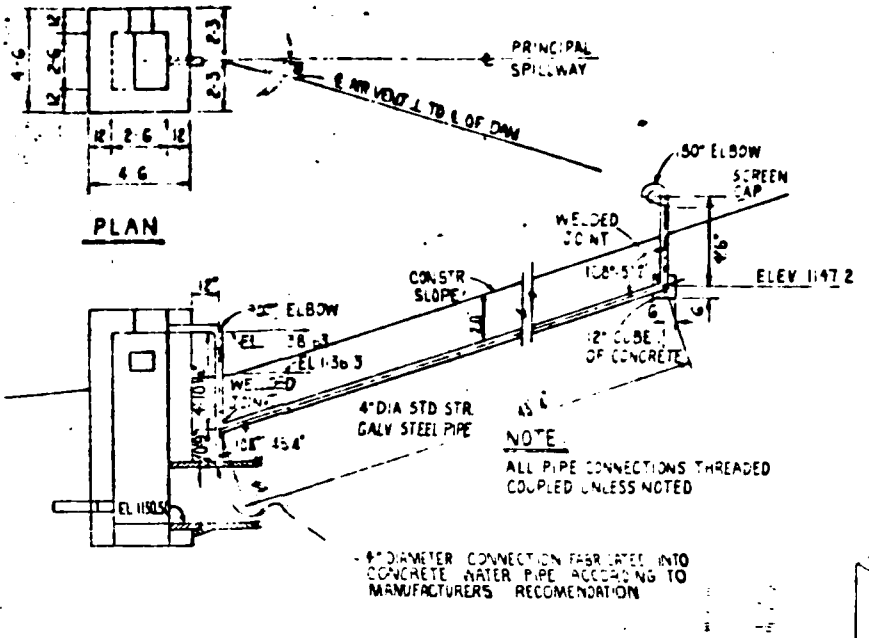
SCALE IN FEET

AS BUILT 12/2/68

FINCH HOLLOW, LITTLE CHOCONUT &
TROUT BROOK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2-A &
LITTLE CHOCONUT CREEK
RISER STRUCTURAL DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

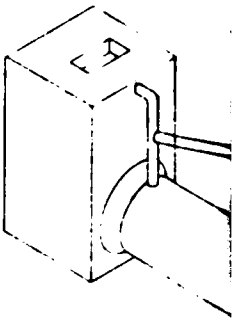
Designed D ZOGRAFOS	Date 8/66	Approved for Construction
Drawn W. YOLTON	8/66	Title
Traced		Scale
Quantities L.B.	3/66	Drawing No. NY-209-P



WELDING DE

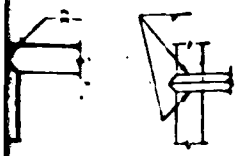
NOTE:

ALL POINTS OF
IRONS TO BE WELD
ENTIRE TRASH
IN ACCORDANCE WI



ISOMETRIC

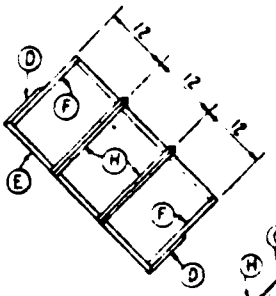
AS BUILT

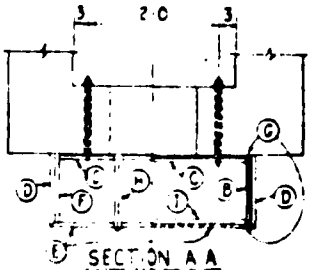


ELDING DETAILS

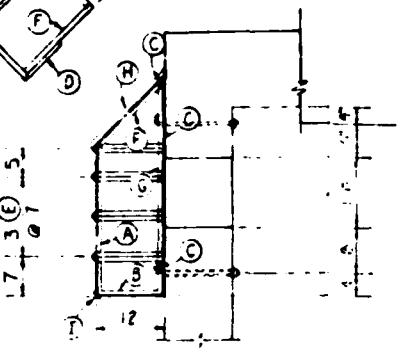
E:

ALL POINTS OF CONTACT BETWEEN ANGLE
NS TO BE WELDED.
ENTIRE TRASH RACK TO BE GALVANIZED
ACCORDANCE WITH SPEC. 119

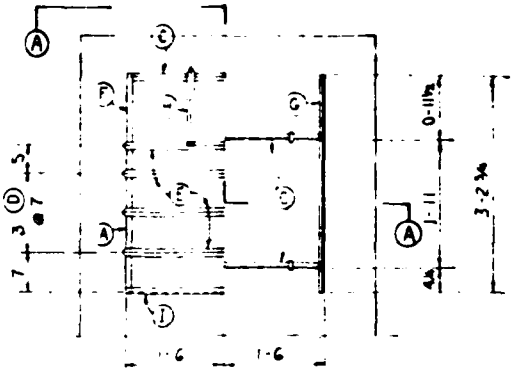




SECTION A-A



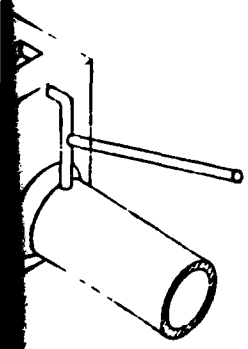
SECTION ON ℄



ELEVATION

RISER TRASH RACK DETAILS

(NOT TO SCALE)



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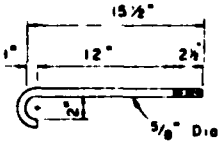
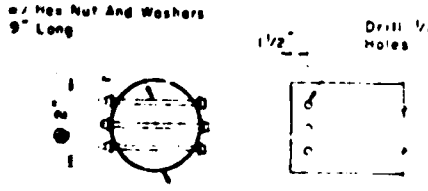


"HOOK" BOLT

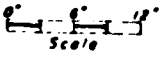
Supply With Hex Nut And Washer

BILL OF MATERIAL

LOCATION	ITEM	SIZE	LENGTH	QUANTITY
TRASH RACK	A ANGLE IRON	[illegible]	2'-2¾"	2
	B "	"	1'-0"	2
	C "	"	2'-11½"	5
	D "	[illegible]	1'-0¾"	8
	E "	"	3'-1½"	4
	F "	[illegible]	1'-5"	2
	G "	"	3'-2⅜"	2
	H "	[illegible]	1'-0⅜"	2
	I "	[illegible]	3'-0"	1
	GAL. PIPE SLEEVE	5/8" DIA	1'-0"	4
	HOOK BOLTS W NUT & WASHER GAL	½" DIA	1'-3½"	4
AIR VENT	GAL. STD STR PIPE	4" DIA	55'-5½"	-
	180° ELBOW, GALV	4" DIA	-	1
	90° ELBOW, GALV	4" DIA	-	1
	CAP-SCREEN, GALV	4" DIA	-	1



SMALL ANIMAL GUARD DETAILS

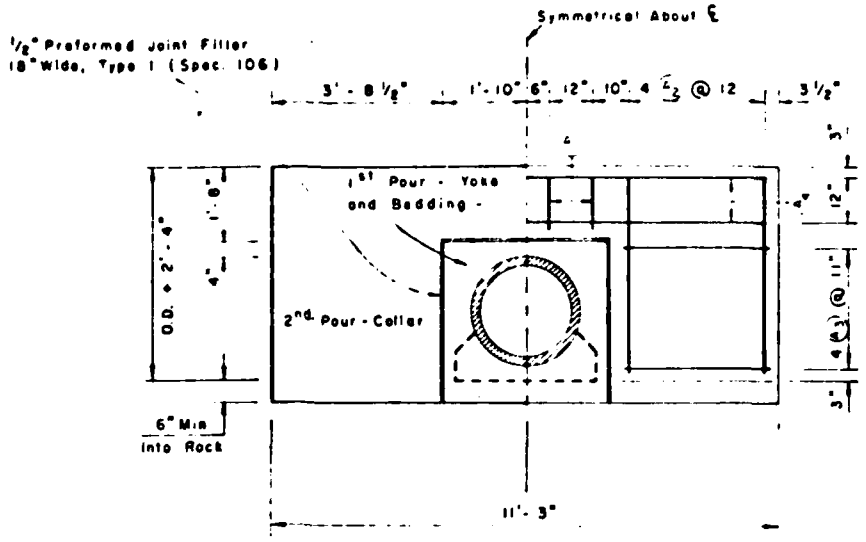


AS BUILT 12/2/68

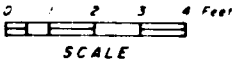
FINCH HOLLOW, LITTLE CHOCONUT & TROUT BROOK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2-A
TRASH RACK, VENTING TUBE AND ANIMAL GUARD

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

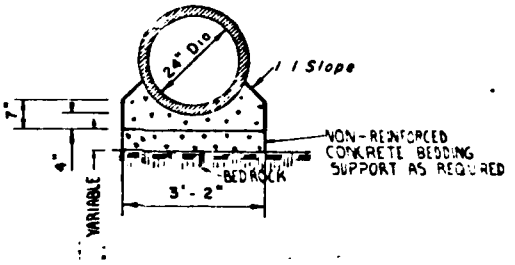
D ZOGRAFOS	6/66		
	6/66		
LB	9/66	10 14	NY-2016-P



REINFORCED CONCRETE ANTI-SEEP COLLAR

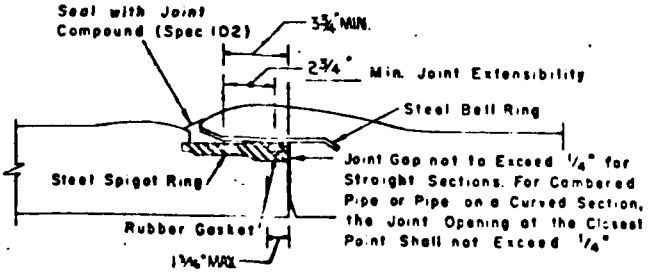


5 - Req'd



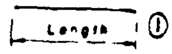
CONCRETE BEDDING

(NON-REINFORCED CONCRETE)



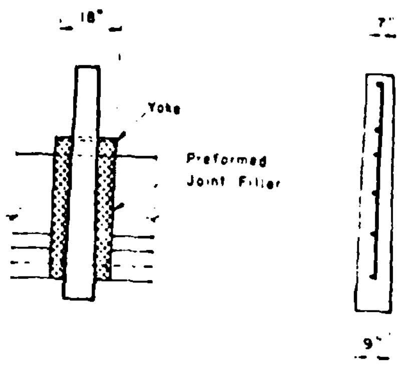
REINFORCED CONCRETE WATER PIPE JOINT

BAR TYPE



AS BUILT

ANTI-SEEP COLLAR STEEL SCHEDULE						
Mark	Size	Length	Type	Quan / Collar	Total Quan	Total Length
A-1	4	1-3	1	4	20	25-0
A-2	4	4-3	1	8	40	170-0
A-3	4	3-3	1	8	40	130-0
A-4	4	10-9	1	2	10	107-6



TOTAL QUANTITY FOR COLLARS CRADLE, BEDDING AND SUPPORT

STEEL

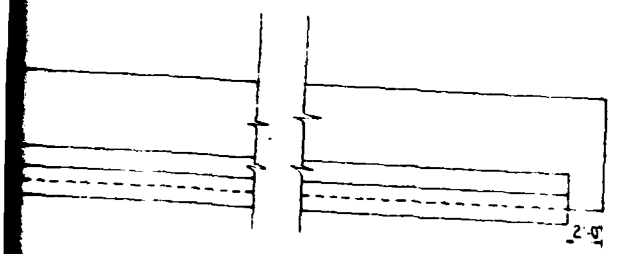
No 4 Bar 432.5 = 288.91 Lbs

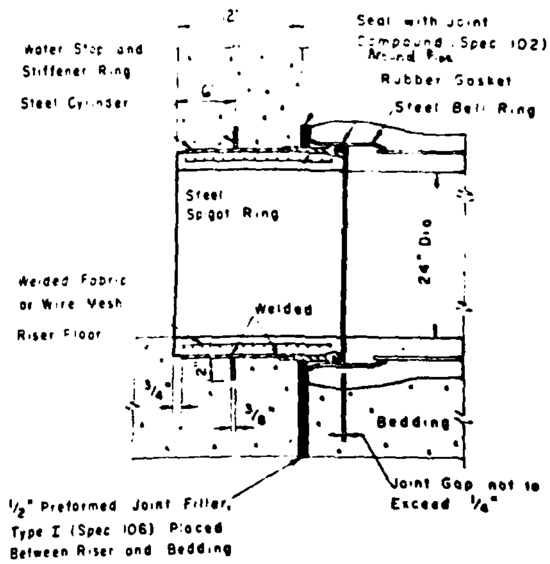
CONCRETE

REINFORCED ___ Cu YDS
NON REINFORCED ___ Cu YDS

P COLLAR

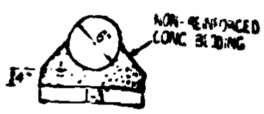
5 - Req'd





SPIGOT RING WALL FITTING

AS BUILT 12/2/68



DRAIN CONCRETE BEDDING

FINCH HOLLOW, LITTLE CHOCONUT & TROUT BROOK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2-A
LITTLE CHOCONUT CREEK
COLLAR, BEDDING & MISC DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed L. C. IBBITSON	Date 8/66	Approved by
Drawn H. T. Browning, Jr.		Title
Traced		Title
Checked LB	9/66	Sheet 11 of 14 — Drawing No. NY-2016-P

POND DRAIN TRASH RACK BILL OF MATERIALS

ITEM		SIZE	LENGTH	QUANTITY
Angles vert	(A)	[illegible]	[illegible]	2
" "	(B)	[illegible]	[illegible]	4
" "	(C)	[illegible]	[illegible]	4
Steel Bar	(D)	½" Dia	2'-4"	6
" "	(E)	½" Dia	1'-5"	2
" "	(F)	½" Dia	2'-0"	5
Anchor Bolt		½" Dia	2'-6"	6

POND DRAIN STEEL SCHEDULE

MARK	QUAN	SIZE	LENGTH	TYPE	TOTAL LENGTH
T-1	8	4	2-0	1	16 00

BAR TYPES

(1) ——— Length ———

POND DRAIN INLET QUANTITIES

STEEL

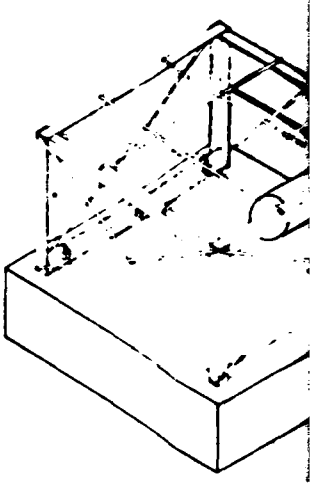
No 4 Bar 160 Lin Ft 107 Lbs

CONCRETE

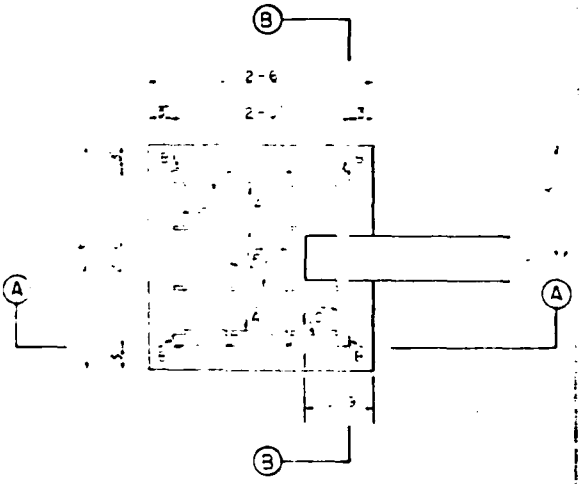
Reinforced 0.17 Cu Yds

CONSTRUCTION DETAILS

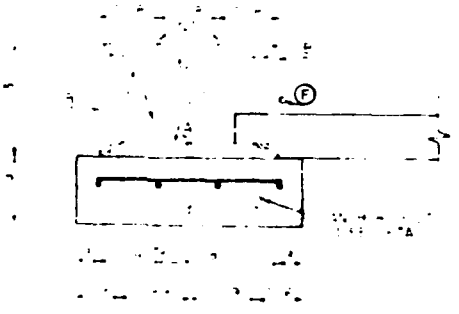
1. All points of contact between angles and between reinforcing bars and angles to be welded
2. Material in pond drain trash rack shall conform to Spec 117 for structural carbon steel plates, shapes and bars
3. Trash rack shall be painted in accordance with Spec 22



ISOMETRIC
NOT TO SCALE



PLAN



SECTION A-A

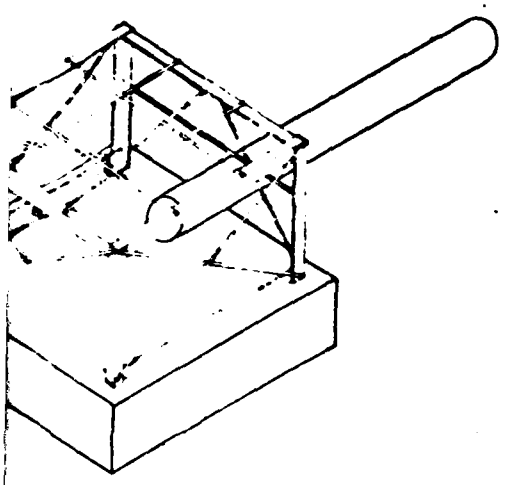
SCALE [illegible]

SECTION B-

ANCHOR BOLT DET

NOT TO SCALE

AS BUILT



ISOMETRIC
NOT TO SCALE

ANCHOR BOLT DETAIL
NOT TO SCALE

SECTION B-B

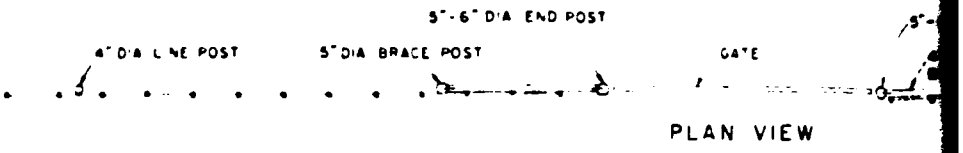
ANGLE IRON (A)
NOT TO SCALE

AS BUILT 12/2/60

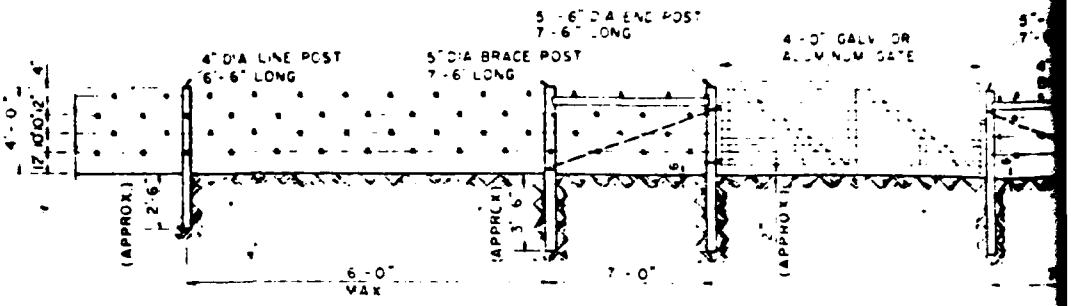
FINCH HOLLOW, LITTLE CHOCONUT & TROUT BROOK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2-A
LITTLE CHOCONUT CREEK
POND DRAIN INLET DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

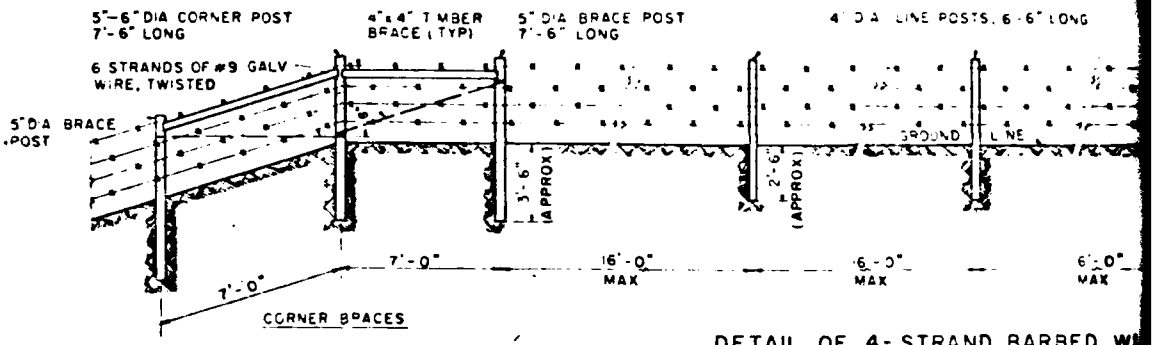
12.66



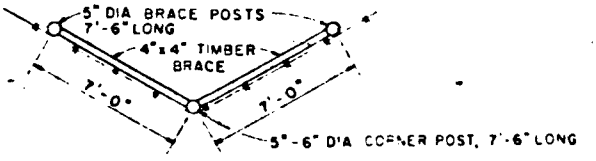
PLAN VIEW



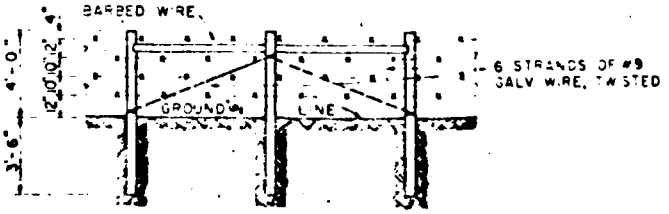
TYPICAL GATE SECTION



DETAIL OF 4-STRAND BARBED WI



PLAN VIEW



TYPICAL CORNER AND DIRECTION CHANGE BRACING

AS BUILT

CONSTRUCTION DETAILS

1. BRACE POSTS, MAXIMUM SPACING 7'-0" CENTER TO CENTER
2. LINE POSTS, MAXIMUM SPACING 6'-0" CENTER TO CENTER
3. STEEL POSTS MAY BE SUBSTITUTED FOR LINE POSTS
4. NOTCH POSTS 3/4" FOR TIMBER BRACE
5. THE TOPS OF ALL POSTS SHALL HAVE THE MINIMUM DIAMETER IN INCHES SHOWN ON THE PLANS
6. BARBED WIRE SHALL BE GALVANIZED STEEL, 12½ GAUGE WITH 4 POINT ROUND BARBS SPACED APPROX 5 INCHES APART
7. CREOSOTED TIMBER POSTS MAY BE PENTACHLOROPHENOL (OIL TYPE) WOOD PRESERVATIVE SHALL BE USED.

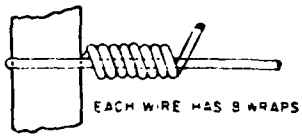
5'-6" DIA END POST
4"x4" TIMBER BRACE
5" DIA BRACE POST
BARBED WIRE
4" DIA LINE POST

5'-6" DIA END POST
7'-6" LONG
4"x4" TIMBER BRACE
5" DIA BRACE POST 7'-6" LONG
BARBED WIRE
4" DIA LINE POST 6'-6" LONG
GROUND LINE
6 STRANDS OF #9 GALV WIRE, TWISTED
7'-0"
16'-0" MAX

TION

" LONG
BARBED WIRE
5" DIA BRACE POSTS 7'-6" LONG
6 STRANDS OF #9 GALV WIRE, TWISTED
6'-0" MAX
16'-0" MAX.

LINE BRACES OR END POST



1/2 WESTERN UNION SPLICE
(AT END AND GATE POST)

ARBED WIRE FENCE

FULL WESTERN UNION SPLICE

WIRE SPLICING DETAIL

LONG
#9 ISTED

5'-6" DIA
POST NOTCHED
4"x4" TIMBER BRACE

POST DETAIL

BRACE WIRE SHALL COMMENCE AND END WITH ATLEAST ONE AND A HALF COMPLETE TURNS AROUND THE POST AND SHALL BE SECURELY STAPLED TO THE BACK OF THE POST.
BRACE WIRES SHALL BE TWISTED AT THEIR MID POINTS TO MAKE THE ASSEMBLY RIGID.

AS BUILT 12/2/68

FINCH HOLLOW, LITTLE CHOCONUT & TROUT BROOK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2-A
LITTLE CHOCONUT CREEK
FENCE DETAILS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

WM. A. ALLABAND
W. H. MORGAN
C. B. FORD
NORMAN W. WILSON

13
14

NY-2016-P